CHEROKEE WRITING REEXAMINED: A LINGUISTIC ANALYSIS OF THE CHEROKEE SYLLABARY

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ABSTRACT

Melissa B. Klein: Cherokee Writing Reexamined: A Linguistic Analysis of the Cherokee Syllabary.
(Under the direction of David Mora-Marín)

This thesis applies a novel methodology to analyze the graphic forms of the Cherokee Syllabary to address the questions: Is the Cherokee Syllabary a pure syllabic writing system, and if so, did it start out that way? Calligraphic terminology was borrowed to identify and analyze the anatomical pieces of Cherokee graphemes. Previous scholars have explored the Cherokee Syllabary in-depth, but did not apply a systematic formal and structural analysis to the sign inventory. Through my analysis, I observe that 1) MCS (Modern Cherokee Syllabary) is a syllabic system, 2) OCS (Original Cherokee Syllabary) may have features of a mixed system with abugida-like diacritics, 3) OCS and MCS graphemes are formally related, 4) approximately 50% of the possible diacritics in OCS were maintained into MCS graphemes, and 5) many CS graphemes were borrowed and repurposed from the Roman alphabet, resulting in graphemic divergence through the alterations of rotation, deletion, and substitution.

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INTRODUCTION

The Cherokee language is a renowned and respected writing system, having only been recently created in the 1800s. The Cherokee Syllabary (CS) is considered an exemplar of syllabic writing systems, with almost no graphic features corresponding exclusively to segmental values. However, Cherokee writing has not always looked like it does today, and this raises the question as to whether it always behaved as it does today. The overarching question of this thesis seemed simple: is the Cherokee Syllabary a syllabic writing system? However, a number of unforeseen complications came to light, introducing a number of secondary questions that must be addressed: 1) are the originally created Cherokee syllabary (OCS) graphemes related to the modern Cherokee syllabary (MCS) graphemes in use today, 2) could any hypothetical diacritics of OCS have been maintained into the MCS graphemes, and finally 3) what could account for these graphemic transformations?

These questions were investigated systematically, with the utilization of calligraphy terminology to identify the anatomical structures of individual graphemes. Through the methodological analysis and comparison of the anatomical structures of OCS and MCS graphemes, it became evident that 1) MCS is a syllabic system, 2) OCS may have features of a mixed system with abugida-like diacritics, 3) OCS and MCS graphemes are formally related, 4) approximately 50% of the possible diacritics in OCS were maintained into MCS graphemes, and 5) many MCS graphemes were borrowed and repurposed from the Roman alphabet, resulting in

graphemic divergence, with respect to OCS, through the alterations of rotation, deletion, and substitution.

To address my research questions, I begin by contextualizing the analysis through a discussion of Cherokee history, culture, language, and writing in Chapter 1. Chapter 2 continues on to review the known varieties of the world's writing systems, including a description of writing developmental processes and a typology of graphic changes. Within Chapter 2, it will become evident that only 3 varieties of writing systems are necessary to discuss in Chapter 3: 1) syllabic, a writing system in which graphemes correspond to syllables, 2) an abugida, in which graphemes correspond to a consonant and default vowel, routinely altering to represent other vowels, and 3) mixed writing systems. Chapter 3 contains the details of my analyses, breaking OCS and MCS graphemes into their formal features, identifying patterns in the Sequoyan and Worcester arrangement of CS graphemes, calculating levels of graphemic correspondence, and examining the evolution of Cherokee graphemes.

CHAPTER 1. CONTEXTUALIZING: CHEROKEE HISTORY, CULTURE, AND LANGUAGE.

1.1. SOCIETY & CULTURE

1.1.1. Before Contact with Colonizers

Before contact with colonizers, Cherokee people traditionally referred to themselves as <a-ni-yu-n'-wi-ya,> or "the real people." Geographically, the Cherokee occupied approximately 40,000 square miles of land; this included lands in modern Alabama, the Carolinas, Georgia, Kentucky, Tennessee, and the Virginias (Seppi, 2013; Perdue, 2005). Throughout this region, there were several autonomous villages, consisting of a few hundred people per village (Bender, 2015; Perdue & Green, 1995). These communities typically consisted of palisades around extended families during the winter season, and became clustered towns during the summer season (Finger, 1991). The structures of the houses were also seasonal, with rectangular, wooden housing in the summer and round, mud insulated shelter in the winter. The villages sustained themselves through horticulture and hunting for subsistence; women controlled the fields and harvested corn, beans, squash, and other vegetables. Women were extremely important in the Cherokee culture politically, as the community was matrilocal and matrilineal with children inheriting the mother's clan affiliation (Bender, 2015; Finger, 1991; Perdue & Green, 1995). Within the community, decisions were arrived at through consensus, and leaders were not elected but rather were individuals who inspired followers (Perdue & Green, 1995).

1.1.2. After Contact with Colonizers

The first recorded contact of Europeans and Cherokee peoples was in 1540 AD, when Hernando de Soto from Spain visited the Americas. In 1673 AD, the Cherokee made contact with the English for the first time (Finger, 1984). From this contact with the Europeans, disease became prolific as native peoples did not have immunity to European diseases, which killed approximately one third of the Cherokee population (Perdue & Green, 1995; Perdue, 2005). The Cherokee perceived Europeans to be physically and sexually aggressive, more so than many neighboring native tribes (Perdue, 2005).

As the demographics and environment of the Americas changed due to European westward exploration, "cultural changes…were rapid, dramatic, and painfully obvious" for the Cherokee Nation (Perdue, 2005: 16). Cherokees traded bow and arrows for firearm power, included new fabrics in traditional attire, and utilized metal farm tools (Finger, 1984). The traditional villages transformed into towns with only nuclear families living in individual cabin homesteads. Women's roles incorporated new responsibilities, while still maintaining many aspects of their lives before European contact. Some women transitioned from working the fields to working within the home, while other Cherokee women continued to hoe the corn (Perdue & Green, 1995). Initially, and contrary to European influence, Cherokee women continued to own their home and fields, and exerted significant political and military influence within the community (Finger, 1984). As community fields became individual family farms, the men of those family largely abandoned hunting to tend cattle and farm (Perdue & Green, 1995). If the men hunted, the hunting was not for subsistence but rather for the trade of animal furs and skins. Following European values, the line of succession in families began to shift from a matrilineal system to a patrilineal descension (Bender, 2015; Finger, 1991).

The Cherokee were a powerful group in the Southeast and proved to be a vital political ally. Many Cherokee citizens "acquired" African American slaves and purchased businesses such as taverns, mills, stores, tanneries, and ferries, which granted them dominating political influence in the region (Perdue & Green, 1995: 13; Finger, 1984). Similarly, many Cherokee "Southern chiefs were renowned for their diplomatic skills, and white negotiators had to be adaptable and wary when dealing with them" (Finger, 1984: 4). During numerous colonial battles, the Cherokee were crucial to success, such as in the French & Indian War (1756-1763) with the Cherokees initially siding with the British but shifting to support the French (Perdue & Green, 1995; Finger, 1984; Perdue, 2005).

While the English were still in power, the British King's proclamation in 1763 prohibited settlement west of the Appalachians, but this proclamation was not heeded by the masses. Because of the King's proclamation and support, the Cherokees viewed the settlers as their enemy rather than the crown (Perdue & Green, 1995). Accordingly, the Cherokee supported the English during the Revolutionary War (Perdue, 2005: 26). After the defeat of the British during the Revolutionary War, the Cherokee Nation's land was a part of the land that was ceded (Perdue & Green, 1995: 7). Initially the US Congress granted American citizens the right to settle on Cherokee land, however after negotiations and protests, Congress sought peace through the treaty of Hopewell in 1785 that permitted Cherokees to maintain their land and take measures against trespassers (Perdue & Green, 1995: 8).

Principal Chief Ross was responsible for the Cherokee nation and equal to the standing of President (Perdue & Green, 1995). While President Jackson pushed for the Indian Removal Act of 1830, otherwise known as the Trail of Tears, the majority of the Cherokee Nation supported Chief Ross in his desire to maintain the current Cherokee lands and to cede no further. In an

effort to retain the tribal land legally, the Cherokee employed lawyer William Thomas (Perdue & Green, 1995). While the majority of the Cherokee Nation supported Ross and the preservation of Cherokee land, some Cherokees voluntarily chose to move westward to escape the tumultuous political environment and aggressive American settlers (Perdue, 2005; Perdue & Green, 1995).

A small faction of the Cherokee Nation, labeled the Treaty Party, opposed Chief Ross and actively supported the US Indian Removal Act (Perdue, 2005). The US government swindled the Cherokee Nation by signing a treaty with this small defecting Treaty Party, duplicitously allowing them to speak for the entirety of the Nation; this treaty is known as the Treaty of New Echota and was signed on December 29, 1835. Chief John Ross and the majority of the Cherokee population lobbied and protested their lack of representation at the Treaty of New Echota's signing, obtaining 15,000 Cherokee signatures on a petition protesting the treaty, but the Senate ratified the treaty, signed by 100, as legally binding in 1836 (Perdue & Green, 1995; Perdue, 2005). Two years after the ratification of the fraudulent New Echota Treaty, US soldiers came to Cherokee land and began to force individuals to travel west. In an attempt to secure safe passage westward, Chief Ross negotiated for the Nation to oversee their own emigration.

The Cherokee organized their own removal and emigrated between 1838-1839 (Perdue, 2005; Perdue & Green, 1995). During the Trail of Tears, it is estimated that approximately one third of the entire Cherokee population died (Redmond & Weithaus, 2009). A branch of the Cherokee community was permitted to stay in North Carolina because of an 1819 treaty, and Quallatown residents remained. Their legal aid, William Thomas, campaigned and persuaded North Carolina to pass an 1837 act allowing permanent North Carolina residency to the Cherokee of Quallatown (Perdue & Green, 1995). These few thousand Cherokees that remained

in the mountains of North Carolina are the ancestors of today's Eastern Band of Cherokee Indians (EBCI) (Redmond & Wiethaus, 2009).

1.1.3. Cherokee in the 20th & 21st Centuries

Today, there are three federally recognized Nations of the Cherokee people, comprising the largest population of the 565 federally recognized American Indian tribes: the Cherokee Nation in Oklahoma, the United Keetoowah Band of Cherokee Indians in Oklahoma, and the Eastern Band of Cherokee Indians in North Carolina. While over 800,000 people self-identified as Cherokee in the 2010 census, only 300,000 are officially enrolled in one of these tribes (Seppi, 2013).

The EBCI is located in the mountains of North Carolina on the Cherokee reserved lands known as the Qualla Boundary. The EBCI land is unlike most federal Native American reservations as it is not truly a reservation; the land was purchased privately on behalf of the EBCI and is currently held in trust by the federal government. The Qualla Boundary is made up of approximately 56,573 acres of land spread across three towns and four counties. The official 1990 US census found that 6,527 people lived on the EBCI land with the ethnic and racial distinctions of the population as follows: 1,094 white, 15 black, 5,387 American Indian, 1 indigenous Alaskan, 13 Asian/Pacific Islander, 66 Hispanic, and 17 other (Bender, 2015).

In terms of government organization, the Cherokee of North Carolina are self-governed and autonomous as a sovereign Nation with independent laws, elections, a government body, and institutions ("Learn about the Cherokee," 2018). The EBCI is served by a 12-member representative body called the tribal council with a 3-person executive committee including a Principal Chief, Vice Chief, and an Executive Advisor (Bender, 2015).

The number of monolingual Cherokee speakers has been dwindling since contact with the European colonizers, and a 2005 study uncovered that with a population of 10,000 in the EBCI, only 420 members were fluent speakers of Cherokee. Furthermore, of the 420 fluent Cherokee speakers, 72% were older than 51, and only 2% of households spoke Cherokee at home (Kituwah Celebration Program, October 7, 2009). Informally, the number of Cherokee speakers is said to be around 200-260 speakers today (Daruma, 2018). A Smoky Mountain News article claims that the most recent census of the Qualla Boundary was in 2001, and the tribal council has unanimously voted for a new census as of 2017 (Cherokee to conduct census). The Cherokee Nation in Oklahoma completed a survey in 2002 and found that no one under the age of 40 spoke the language fluently, and less than 11% of Cherokee Nation citizens used Cherokee at home. In the United Keetoowah Band, it is said that at least 60% of the tribe still speaks Cherokee (Montgomery-Anderson, 2018: 7).

According to the "language vitality and endangerment" categories of UNESCO, Cherokee is considered "severely endangered," as the language is only spoken by the grandparental generation and by a minority of the population. Languages in this category are expected to go extinct in three decades unless steps are taken. Using this estimate, the language will have no first languages speakers left by 2050 if no revitalization efforts are made (Kituwah Celebration Program, October 7, 2009; Montgomery-Anderson, 2018). Even so, the Cherokee language is considered to have a relatively large number of speakers for American Indian communities today, as Cherokee speakers constitute the seventh largest group of indigenous language speakers in the US (Montgomery-Anderson, 2015; Redmond & Wiethaus, 2009).

With the number of fluent Cherokee speakers diminishing, all three tribes have shown interest in language revitalization. The 2005 study in the EBCI prompted a strong response from

the community, becoming the catalyst for a major language revitalization effort; programs and organizations such as the Kituwah Language Revitalization Initiative, the New Kituwah Academy immersion program, the Cherokee Language Consortium, and Kituwah Preservation and Education Program (KPEP) were created (Kituwah Celebration Program, October 7, 2009; Redmond & Weithaus, 2009). The Cherokee Nation in Oklahoma passed the Cherokee National Language and Cultural Preservation act and created the Cultural Resource Center (CRC) in 1995. One impact that the CRC had was the increase of Cherokee language signage in downtown Tahlequah, OK, at Cherokee schools, and on administrative buildings. The United Keetoowah Band installed a Department of Language, History, and Culture in 2005, as well as the Keetoowah Cherokee Youth Choir (Montgomery-Anderson, 2018).

1.1.4. Cherokee Literacy

The Cherokee people did not have a writing system to record the Cherokee language until Sequoyah created the CS. In the Americas North of Central Mexico, there was no evidence of native literacy in traditional writing techniques before 1492 (Walker & Sarbaugh, 1993). While traditional writing was not present before 1492 in North America, other forms of symbolic record keeping did exist, including pictographic symbols on animal hides and tree bark, petroglyphs on rocks, Wampum beads, and notched sticks (Mithun, 1999). Wampum was a prevalent method of record keeping, which utilized small beads typically made from quahog clam shells that enabled humans to extend inherited knowledge in an interconnected, nonlinear method. A wide range of information was embedded through wampum, such as alliances, treaties, marriages, proposal, ceremonies, and wars. Wampum were regularly reread "through the community memory and performance, as Wampum is a living rhetoric that communicates a mutual relationship between two or more parties" (Hass, 2007: 80). While Wampum is a distinct

media that encodes information, it is not a writing system by western and academic definition, as the information cannot be recovered exactly without intervention of an utterer (Daniels & Bright, 2005: 4).

The existence of Wampum, a non-glottographic mnemonic device, sets a precedence for the concept of literacy in the Cherokee culture. Yet, the necessity of glottographic literacy for reading and writing escalated upon contact with Europeans. Conditions changed rapidly due to colonization and the "pressure of proximity to the dominant Euro-American society" (Silver & Miller, 1997: 198). There is a wide range of estimates for literacy rates amongst the Cherokee population in the early 19th century, with most sources estimating that 25-90% of the Cherokee population was literate and highest literacy rates being in "full blood" communities. Cherokee literacy is thought to have been higher than most of their white neighbors in the 19th century, but it is unclear as to whether Cherokee literacy rates were recorded for English writing or Cherokee writing (Montogmery-Anderson, 2018).

Upon the CS's creation, Cherokee writing was used for letter writing, Bible recitations, and native medicine. In 1828, the CS was transformed to be functional on a printing press and was used in the Cherokee Phoenix weekly newspaper (Silver & Miller, 1997). The newsletter printed portions of the Bible, copies of bills and laws, political pamphlets, hymn books, and religious documents in both English and Cherokee. After the Trail of Tears and the Civil War, the printing press was confiscated by the US government, to pressure the Nation to incorporate into the state of Oklahoma (Walker & Sarbaugh, 1993; Montgomery-Anderson, 2005).

While the CS experienced an inrush of usage originally, CS literacy began to decline in early 20th century Oklahoma as the Cherokee were a minority in their adopted homeland when Oklahoma was declared a state of America. In 2003, a survey found that only 4% of the

population could read the CS, and < 1% were able to write in the CS (Montgomery-Anderson, 2018). Even in communities with higher rates of Cherokee speakers, it was rare to find literacy in the CS. Montgomery-Anderson (2018), who works with the Cherokee Nation in Oklahoma, has recorded an increase in Cherokee signage in Tahlequah, OK and recounts that students in the immersion programs typically learn only the CS to represent the Cherokee language in the classroom, rather than a phonetic transliteration of Cherokee. Bender (2015) observes a strikingly different pattern of literacy in immersion programs for the EBCI students in North Carolina, in that the CS plays more of a symbolic role than a functional role. Today, it is estimated that 35-65% of the Cherokee community is literate in the CS with limited domains of use, including classrooms, churches, signage, and places of native doctoring (Montgomery-Anderson, 2018; Bender, 2015; Silver & Miller, 1997).

1.2. THE CHEROKEE LANGUAGE

The Cherokee language is a member of the Iroquoian language family, and notably is the most divergent branch of the family as the sole member of the Southern branch (Feeling & Pulte, 1975; Rogers, 2005). The ancestral language of Proto-Iroquoian was likely spoken around the Great Lakes and split into the Northern and Southern branches between 3,500-4,000 years ago (Montgomery Anderson, 2015; Campbell, 1997). The first recorded contact with the Iroquoian language family by colonizers occurred in 1534. At that time those who spoke an Iroquoian language occupied land from Quebec to Georgia, and along the coasts of Virginia and North Caorlina, to Ontario (Campbell, 1997). By the 18th century, there were three recognized dialects of Cherokee: 1) the Lower or Underhill dialect, which was spoken in northwest South Carolina but is now extinct, 2) the Middle dialect that is predominantly spoken by the EBCI in North

Carolina, and 3) the Overhill, Otali, or Western dialect that is spoken predominantly in Oklahoma (Montgomery-Andersom, 2015; Redmond & Weithaus, 2009).

1.2.1. Phonemic Inventory

The number of phonemes present in Cherokee is variant and inconsistent in the literature; it is well known that the Overhill and Middle dialects have differences in which phonemes are used, however few sources distinguish which dialect they are referring to. Lounsbury (1978) was able to reconstruct the phonemic inventory for Proto-Iroquoian, with 9 consonant phonemes and 6 vowel phonemes; in IPA, they are as follows: /t, k, ʔ, s, h, r, n, w, y; i, e, a, o, u, ə̃/. These phonemes were likely present before the split of the Northern and Southern Iroquoian branches.

When examining modern Cherokee, Montgomery-Anderson (2015) states that there are 23 consonant phonemes and 6 vowel phonemes. He does not list the phonemes in IPA, but rather in Roman orthography, so the exact pronunciation is unclear. While Montgomery-Anderson (2015) typically works with the Cherokee Nation in Oklahoma, he does not specify if these phonemes are for all dialects of the language, or for a specific dialect. He lists the phonemes as follows: "d, t, g, k, dl, tl, gw, kw, j, ch, ts, l, hl, w, hw, w, y, hy, n, hn, h, s, m, ʔ, a, e, I, o, u, v." Silver and Miller (1997) state that Cherokee has 19 consonantal phonemes and 6 vowel phonemes, but do not list which specific phonemes are present, nor what dialect they are describing. Scancarelli (1996) identifies 21 consonant phonemes but does not discuss vowel phonemes; the consonant phonemes she provides for Cherokee include: /k, k^h, h, l, ɬ, m, n, hn, k^w, kwh, s, t, t^h, tl, tlh, ts, tʃ, w, hw, j, hj/. As is the case with the previous scholars, the specific dialect is not mentioned. Flemming (1996) states that Cherokee has 18 consonantal phonemes and 6 vowel phonemes, and Rogers (2005) states that Cherokee has 13 consonantal phonemes

and 6 vowel phonemes, again not distinguishing between dialects. The two figures listed below are Flemming's (1996) and Rogers' (2005) descriptions of the consonantal phonemic inventory of Cherokee. Flemming's (1996) IPA transcriptions do not use modern IPA characters; the character [Ò] is a voiceless dental lateral fricative.

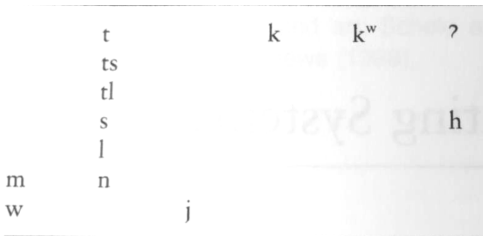


Figure 1. Consonantal Phonemes. Adapted from Writing Systems: A Linguistic Approach (pg 248), by H. Rogers, 2005, Malden, MA: Blackwell Publishing.

	IPA Transcriptions					Orthography				
	labial	dental	palatal /pal-alv	velar	glottal	labial	dental	palatal /pal-alv	velar	glottal
unaspirated plosives		t	tS	k	/		*d*	*j*	*g*	'
aspirated plosives		tÓ	tSÓ	kÓ			*t*	*ch*	*k*	
fricatives		s			h		*s*			*h*
lateral		l					*l*			
lateral fricative		Ò					*hl*			
nasals	m	n				*m*	*n*			
breathy nasals		n^a					*hn*			
glides	w		j			*w*		*y*		
breathy glides	w^a	j^{aa}.				*hw*		*hy*		

Figure 2. Consonantal Phonemes. Adapted from "Laryngeal metathesis and vowel deletion in Cherokee," (pg 4), by E. Flemming, 1996, UCLA Occasional Papers in Linguistics (16), 1-25.

The most reliable phonemic information about the Cherokee language comes from King (1975), Cook (1979), and the Cherokee Papers from UCLA (1996). Cook (1979) and King

(1975) research the Middle dialect spoken in North Carolina, and the UCLA papers (1996) discuss the Overhill dialect spoken in Oklahoma. The UCLA papers (1996) state that the Overhill dialect of Cherokee has 20 phonemes, depicted below in Figure 3.

stops	unaspirated	(b)	d		g	gw	'
	aspirated	(p)	t		k	kw	
affricates	unaspirated		dl	j			
	aspirated		tl	ch			
fricatives			s				h
laterals			l				
nasals		m	n				
glides		w		y			

Figure 3. Consonantal Phonemes. Adapted from Pamela Munro. (1996). Cherokee Papers from UCLA. UCLA Occasional Papers in Linguistics 16, pp. 1-133.

Cook (1979) and King (1975) explore the phonemic inventory of the Middle dialect more extensively, with Cook (1979) discussing 12 consonants. Only 10 consonants are represented in IPA: /y, w, l, m, n, t, k, s, h, ?/, with the final two consonants being the unaspirated plosive counterparts /b/ and /d/. King (1975) acknowledges 11 consonantal phonemes in the Middle dialect of Cherokee: /t, s, ts, n, l, m, y, w, k, ?, h/.

As made evident in the previous paragraphs, the exact number of phonemes in Cherokee is debated, with the claimed number of consonantal phonemes ranging from 11-23. The vowel phonemes are more widely agreed upon; there are three vowel phonemes, each with a short and long counterpart. The figure below depicts the IPA and orthographic representation of the vowel phonemes of the Cherokee language. The middle vowel, represented as a <v> in Roman orthography, is equivalent to a nasal schwa [ə̃].

IPA			Orthography		
i		u	*i*		*u*
e	ø)	o	*e*	*v*	*o*
	a			*a*	

Figure 4. Vowel Phonemes. Adapted from "Laryngeal metathesis and vowel deletion in Cherokee," (pg 5) by E. Flemmings, 1996, UCLA Occasional Papers in Linguistics (16), 23-44.

1.2.2. Syllable Structure

It is crucial to discuss Cherokee syllable structure when exploring the Cherokee writing system. Syllables are a phonological segmentation of languages, with syllables typically including an onset, nucleus, and a coda. Not all syllables must include an onset or a coda, but all syllables contain a nucleus which is the most sonorous segment (Zec, 2007). Codas and onsets can be complex, containing multiple consonants. A further classification of a syllable is a mora, which adds weight to the syllable making them heavy or light; in languages that pay attention to syllable weight, CV, V, and codal segments typically contain one mora, while diphthongs and long vowels usually contain 2 morae (Zec, 2007).

Unfortunately, linguistic information pertaining to the syllabic structure of Cherokee is as discrepant as the literature on the phonemic inventory. When discussing the Cherokee syllable structure, many grammarians and researchers extrapolate the syllabic structure from the writing system itself; this offers few insights beyond the claim that CV sequences in Cherokee are classified as syllables. This finding itself is quite unsurprising and contributes little to the phonological understanding of the language, as CV sequences are common cross-linguistically.

Holmes (1977) states that "almost all Cherokee syllables end in a vowel" (8). King (1975) attempts to list all possible syllable structures of Cherokee, including: V, VC, VCC,

VCCC, CV, CVC, CVCC, CCV, CCVC, CCVCC, CCCV, CCCVCC; all syllable structures listed also include a long vowel counterpart. King's (1975) proposed Cherokee syllable structures can be seen below in Figure 5, along with examples. Montgomery-Anderson (2015) states that "a Cherokee syllable is typically either a [V or CV segment]" (p. 19). He also discusses "leftover vowels," stating that some words need fewer vowels than the writing system allows for. In these instances, the syllable grapheme is used with the understanding that the vowel is dropped. An example of a word in which a vowel is deleted in consonant cluster "hnd" in the word for "heart:" "adahndo" (Montgomery-Anderson, 2015). However, this is the only information provided on consonant clusters and permissible syllables in Cherokee.

V	ama	'water'
V·	a·ma	'salt'
VC	anthaski ski	'popcorn'
V·C	ʌ·nthi	'pottery'
VCC	ahso?ohntiha	' he is dropping it (Rigid)'
V·CC	a·khthate·ki?a	'I'm thirsty'
VCCC	ahkhstohi	'my pillow'
V·CCC	a·khwthʌtʌhska	'he is asking me'
CV	sutali	'six'
CV·	yo·na	'bear'
CVC	tu·suhkahlʌ·?i	'his toe nails'
CVCC	anahlskwalʌhski	'crow's foot' (Dentari diphylla)
CV·CC	sʌ·khtha	'apple'
CCV	ake·hya	'woman'
CCV·	uhyʌ·tsa	'cold'
CCVC	anihsta?yi·ti?a	'they are approving it'
CCV·C	kwa·ntiya	'stretch mouth snake'
CCVCC	ahlstahyti	'food'
CCV·CC	tsʌhkhe·hwska	'you are forgetting'
CCV·CCC	kahski·tshsʌ?ʌska	'I am dreaming many things'
CCCV	tsi·skwa	'bird'
CCCV·	khwa·na	'peach'
CCCVCC	tsihskwahltiha	'I am running'

Figure 5. Cherokee Syllable Structure & Examples. Adapted from "A Grammar and Dictionary of the Cherokee Language," (pg 33) by Duane King, 1975, (Doctoral Dissertation) Ann Arbor, MI: University Microfilms International.

Feeling & Pulte (1975), when discussing the alphabet and syllabary writing systems relative to the Cherokee language, mention vowel length, stating that vowels which occur at the end of a syllable are always long, however "there are frequent exceptions" (p. ix). Vowels in the "middle" of a syllable are short because "the syllable in which it appears begins and ends with a consonant"; this implies a syllabic coda (p. ix). The information is unclear but suggests that all

syllables without a consonantal coda contain long vowels, and syllables where a consonantal coda is present contain short vowels.

Montgomery-Anderson (2018) discusses Cherokee syllables, stating that syllables can sometimes end with a coda and that the most common coda in Cherokee is [s]. He acknowledges that there are other cases of silent vowels but does not expand on what other codas are permissible beyond [s] and [h].

Scancarelli (1996) discusses Cherokee syllables in the context of spelling conventions when writing in the CS. She attests to the usefulness of the lone C character, <ꮝ> or [s], as syllables in Cherokee may begin with a consonant cluster of [sC] or may have a coda of [Vs] or [CVs]. She recognizes two other phonemes that can be the coda of a syllable: /h/ and /ʔ/; in these instances, one uses a fictive vowel, which a native speaker would be able to identify. She does not discuss other consonant clusters explicitly, but uses example words that contain consonant clusters not discussed with the sounds /kt^{h}/ and /hn/ in the examples [kt^{h}oːʔa] 'it is hanging (of a long object)' and [kə̃ːhna] 'she/he is alive.'

1.2.3. Morphology & Syntax

Cherokee is a polysynthetic language, and as such I will not be able to extensively describe the morphological structure of the language. However, I would like to provide general information to inform the discussion of morphological writing systems. Cherokee words can contain a number of morphemes including pronominal prefixes, pre-pronominal prefixes, aspect suffixes, modal suffixes, derivative suffixes, and attributive suffixes. Cherokee verbs have five separate verb stems including present, imperfective, punctual, perfective, infinitive. Within the Cherokee pronominal prefixes, three numbers are distinguished including singular, dual, and

plural (Munro, 1996; Cook, 1979; King, 1975).

When exploring the syntactic structure of Cherokee, simple unambiguous sentences enjoy fairly unrestricted word order, with movement transformations applying freely when unambiguous morphology is present. Most Cherokee sentences include VSO underlying word order, with other possible word orderings including VOS, SOV, OVS, OSV, SVO (Cook, 1979; King, 1975; Montgomery-Anderson, 2015). If a sentence contains ambiguous morphology, word order is important to disambiguate; a detailed discussion of Cherokee morphology and syntax for ambiguous sentences can be found in Montgomery-Anderson's (2015) *Cherokee Reference Grammar*.

1.2.4. Orthography

For the purposes of this thesis, I will be using two main forms of Cherokee orthography: 1) the modern Cherokee font of the Cherokee Syllabary and 2) the standard Romanization of the Cherokee language. Both of these representations of Cherokee will be used in angled brackets, < >, to signify they are Cherokee graphemes. When written in the standard Romanization, dashes will be used to represent the syllable boundaries that are expected with the CS, for ease in transitioning between Roman orthography and Cherokee Syllabary orthography.

Throughout history and regions, scholars have represented the Cherokee language in a number of variant orthographies, and do not all utilize the CS or the standardized Romanization of Cherokee; the range of common orthographies that vary from the standardized varieties can be seen in Appendix B. When referencing another scholars work, if the orthographic conventions used to represent Cherokee are not the CS or standard Romanization, they will be represented in quotes. It may be necessary to discuss the phonetic or phonemic makeup of the language, and as

such both will be written in IPA with phonemes in slashes, //, and phones in square brackets, [ ]. For the sake of consistency, most writing in reference to the Cherokee language will be done in the standard orthography.

1.3. Cherokee Writing System

1.3.1. Sequoyah's Life

The CS was invented by an illiterate monolingual Cherokee speaker, known as Sequoyah, George Gist, or George Guess. Much of Sequoyah's life is unknown or speculated upon, including his name etymology, parentage, and his exact process of creating the CS (Bender, 2015), but across the many sources there are some consistencies. Sequoyah appears to have been born in the late 1770s-early 1780s, likely in Tuskegee, Tennessee, to a Cherokee woman of the Paint Clan, sometimes referred to as Wurteh, Wu-te-he, or Wu-the (Summit, 2012; Basel, 2007). While it is debated, many scholars believe Sequoyah's father to be Nathaniel Gist, a merchant sent to negotiate with the Cherokee community. However, Sequoyah's father was not involved in his life and Wu-te-he raised Sequoyah as a single parent. The meaning of Sequoyah's name is unknown, with suggestions ranging from "pig's foot" to "sand hill crane" and "he guessed it." Sequoyah was a creatively gifted child, and enjoyed painting and drawing. He eventually used his creative skills to become a silversmith and a blacksmith to support his family (Foreman, 1938; Foster, 1885; Summit, 2012; Basel, 2007; Perdue, 2005).

On October 7, 1813, Sequoyah enlisted in the US military and joined the "private cavalry of Captain John McLamore's company of Mounted and Foot Cherokees" (Basel, 2007: 26). He fought in multiple battles, the most notable being the Battle at Horseshoe Bend in 1814 against the Creek Red Stick American Indians. He was discharged on April 11, 1814, and was

compensated $66.80 for 147 days of service in the US military. It is believed that while he was in the army, he sustained an injury resulting in one of his legs being shorter than the other leading him to limp; some historians debate as to whether Sequoyah was born with this disfigurement or if he received it from military injury (Basel, 2006; Foreman, 1938; Summit, 2012).

After he was discharged from the military, Sequoyah married Sally Waters from the Bird Clan. There is speculation that he had multiple wives, possibly up to five. We also do not know the number of children he fathered, with the highest estimate of children recorded as 20; the only children whose names have been recorded in history is a son named Teesee and a daughter named Ahyokah.

Sequoyah likely began working on the Cherokee writing system in 1809, being inspired by witnessing white men record language on "talking leaves." Many scholars acknowledge the story of the CS creation stating that Sequoyah originally began working on a logographic system, using pictographs to represent words of the Cherokee language and eventually moving to arbitrary symbols to represent the words of Cherokee using the materials of tree bark and a knife (Basel, 2007; Foreman, 1938; Foster, 1885; Silver & Miller, 1997; Montgomery-Anderson, 2018; Walker & Sarbaugh, 1993; Bender, 2015). While the literature claims the CS began logographically, there is no evidence to support this idea. The supposed logographic system, so the story goes, became cumbersome to remember due to the sheer number of symbols required, and from there he broke words down into their parts, what we have identified as syllables today, and assigned arbitrary symbols to phonetic syllabic values (Basel, 2007; Foreman, 1938; Foster, 1885; Silver & Miller, 1997; Montgomery-Anderson, 2018; Walker & Sarbaugh, 1993; Bender, 2015). Using this method, he created 86 syllabic graphemes in one month's time, ending the

twelve-year endeavor between 1819-1821 (Summit, 2012; Montgomery-Anderson, 2015; Feeling & Pulte, 1975; Silver & Miller, 1997; Perdue, 2005).

While he was inventing the Cherokee writing system, however, it is recorded that he neglected his family, farm, and community. He was rumored to be lazy and irresponsible, and as his work became public knowledge it was thought that he was practicing "bad magic." His wife, Sally, and his neighbors took it upon themselves to burn down his work space, hoping to dissuade him from the practice. They were unsuccessful, however, as Sequoyah just started his work again. Once he had successfully created the CS, he convinced the Cherokee community to utilize it by having his 6-year-old daughter, Ahyokah, record a message from the tribal council that he then recited back to them. Upon this event, the Syllabary was adopted and disseminated through the tribe, with thousands of Cherokees becoming literate in a few short years (Foreman, 1938; Foster, 1885; Summit, 2012; Basel, 2007; Walker & Sarbaugh, 1993).

The majority of authors and scholars follow this line of Sequoyah's life, however there is one rendition that reports a very different telling of Sequoyah's life. Traveller Bird (1971) claims that this telling of Sequoyah's life is an inaccurate tale. He suggests, alternatively, that Sequoyah is a false name and his true name is George Guess, or Sogwili, and that the CS was in use since 1795 as a means to code information and block the United States' "civilization" program as the "white and the progressive leaders…could not decipher them" (Traveller Bird, 1971: 107). He proclaims that George Guess was taught to speak and write a number of languages, including Spanish, English, French, and other Indian languages, and he began teaching the CS to other Cherokees in the 1820s.

1.3.2. The Original Cherokee Writing System

While the recounting of Sequoyah's life varies, most records presume that he borrowed Roman characters to create the 85-86-character writing system (Basel, 2006; Foreman, 1938; Summit, 2012; Perdue, 2005; Mithuns, 1999). However, this has been proven to not be entirely accurate, as Sequoyah's original syllabic writing system looked entirely distinct from the Roman alphabet (Cushman, 2010). Walker and Sarbaugh (1993) offer an explanation for the variation in character design, suggesting that the graphemes went through multiple generations of style-shifting depending on the purpose. Sequoyah studied with different forms of syllabic characters, making characters that were easier for the pen and easier for printing (Walker & Sarbaugh, 1993). Most historians accepted that Sequoyah created the "longhand" script versions while the English-speaking Missionary, Samuel Worcester, created the "shorthand" print version.

However, Walker & Sarbaugh (1993) convincingly argue that Sequoyah created both the original and modern Cherokee characters at least two years before Worcester arrived. Through the analysis in Chapter 3, we will be able to contribute to this question as to whether Sequoyah or Worcester created the modern characters. For a period of time, the characters could be represented in either way and there is a document, signed by Sequoyah, with all 86 characters with the "longhand" version on the left and the "shorthand" version on the right (Cushman, 2011). This document can be viewed below in Figure 6.

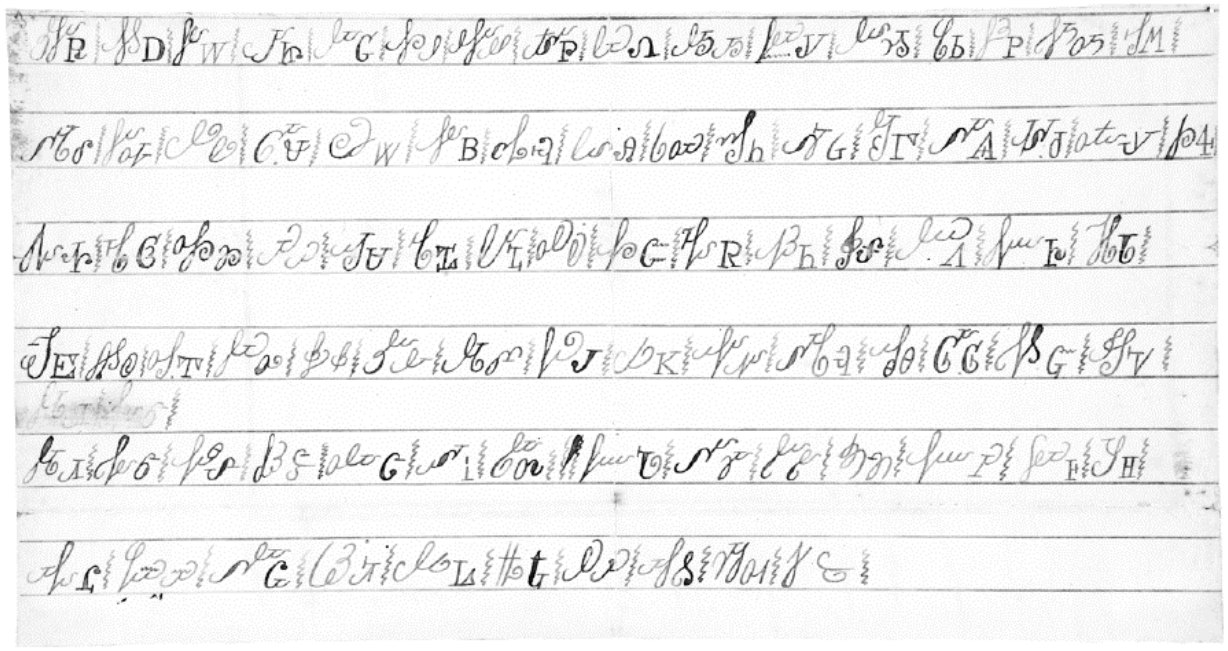


Figure 6. OCS and MCS Characters in Sequoyan Order. Adapted from "The Early History of the CS," (pg 80) by W. Walker & J. Sarbaugh, 1993, Ethnohistory, 401(1), pp 70-94.

As it is not entirely clear if the original system Sequoyah devised was intended to be used as a script, longhand system, I will refer to this representation of the writing system as OCS throughout the rest of the paper. In Figure 7 below, Sequoyah's original syllabograms intended for writing are presented; this chart is not dated or signed, and floats from blog to blog on the internet. While I do not know who wrote this or when, the characters are the same as in other reputable sources.

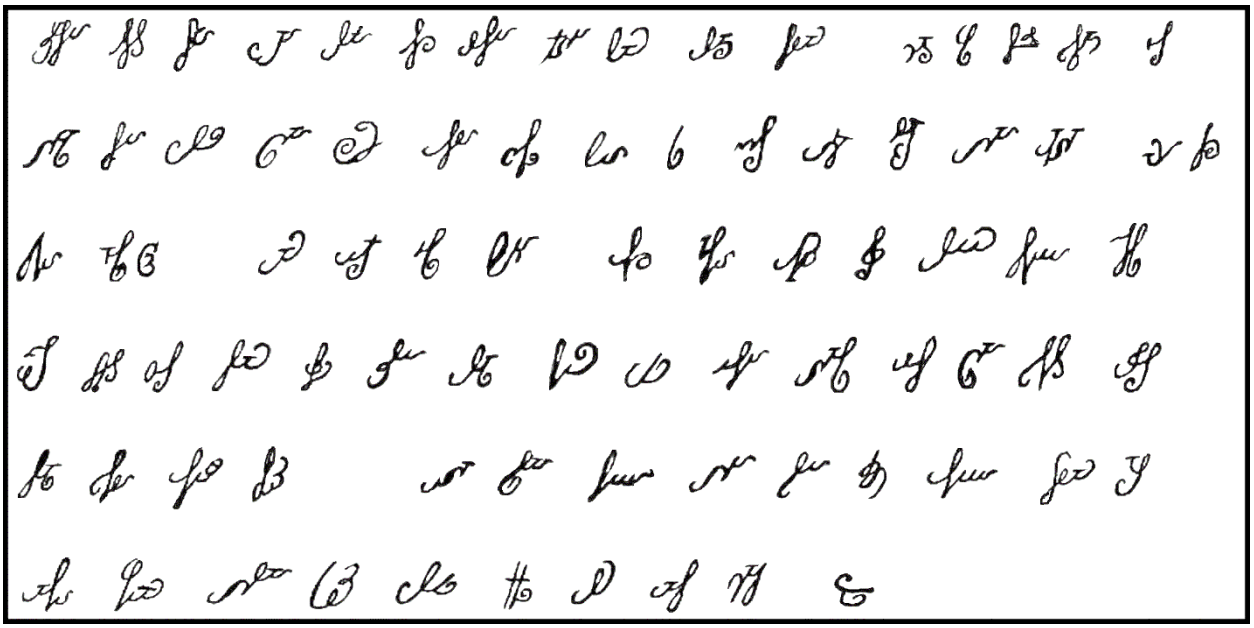


Figure 7. OCS Characters in Sequoyan Order. Adapted from "Will the Real Sequoyah Please Stand Up?", by Dennis, (2014. Retrieved from <https://www.accessgenealogy.com/native/will-real-sequoya-please-stand.html>

1.3.3. The Modern Cherokee Writing System

The transition from the original graphemes to the modern graphemes is largely unknown, including the exact timing and manner of the transition. However, there are some characteristics that have been documented. Firstly, MCS only contains 85 characters, rather than the original 86 characters found in OCS; the grapheme created to represent the phonetic value <mv> was deleted in the modern characters. The graphemes were also shifted to look more like the English alphabet in design, although the characters may have additional strokes added or may be reoriented, and do not possess the same phonetic values (Scancarelli, 1996; Cushman, 2011). These Cherokee print typeface syllabograms found in MCS are virtually unchanged since 1828 (Walker & Sarbaugh, 1993).

Many scholars attribute the modern graphemes to Worcester because they utilize Roman alphabet characters, suggesting that the original system and modern system had two separate inventors. This causes many to believe that the original graphemes and the modern graphemes are completely distinct, unrelated systems. While the modern syllabograms are commonly attributed to Worcester, the modern print typeface was in place before Worcester's contact with the Cherokee people (Walker & Sarbaugh, 1993). Walker & Sarbaugh (1993) offer an alternate theory, suggesting that Sequoyah, the original creator of the CS, created both the original characters and the modern typeface. As it is not clear whether the modern graphemes were intended to be a print, shorthand system, I will be referring to this version of the system as the Modern Cherokee Syllabary (MCS). Figure 8 below presents the MCS characters, and is signed by Sequoyah. Appendix A is a document from the Museum of the Cherokee Indian in Cherokee, North Carolina, which presents OCS and MCS written forms and the printed forms of MCS.

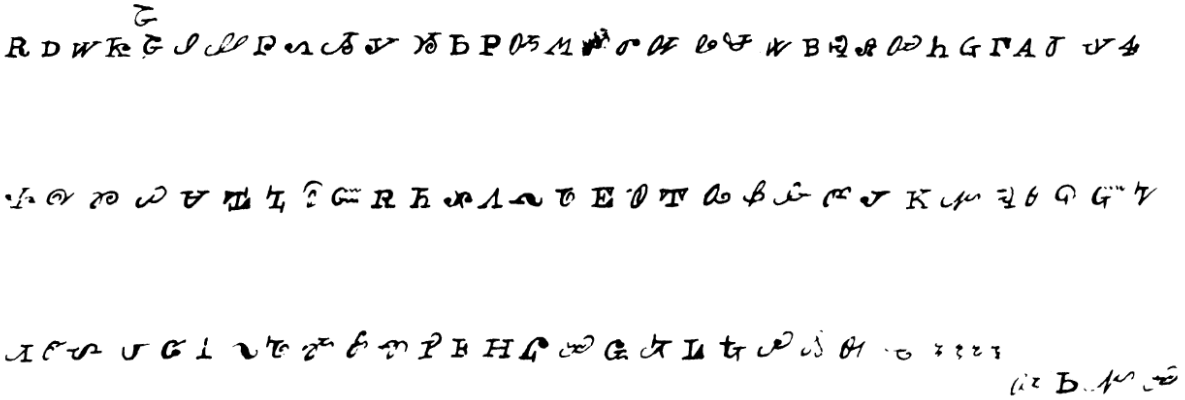


Figure 4. The John Howard Payne syllabary of 1839, signed by Sequoyah. Detail from catalogue no. 4026.312 from the collection of the Gilcrease Museum, Tulsa, OK.

Figure 8. MCS Characters in Sequoyan Order. Adapted from "The Early History of the CS," (pg 78) by W. Walker & J. Sarbaugh, 1993, Ethnohistory, 401(1), pp. 70-94.

1.3.4. Cherokee Syllabary Sign inventory

The MCS sign inventory is described next. The OCS sign inventory can be viewed in Appendix A. The linear organization of the CS is top to bottom, right to left.

1.3.4.1. CV GRAPHEMES

78 of the graphemes in the Cherokee syllabary correlate to CV syllable segments, as seen below in Figure 9.

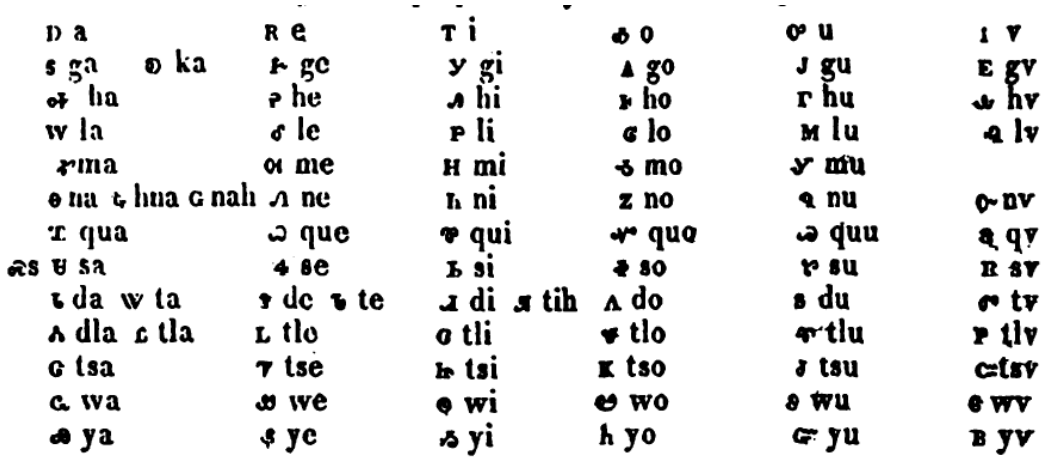


Figure 9. MCS Characters and Phonetic Values in Worcester Order. Adapted from "The Early History of the CS," (pg 73) by W. Walker & J. Sarbaugh, 1993, Ethnohistory, 401(1), pp. 70-94.

1.3.4.2. V GRAPHEMES

There are 6 graphemes that represent individual vowels: /a/ <Ꭰ>, /e/ <Ꭱ>, /i/ <Ꭲ>, /o/ <Ꭳ>, /u/ <Ꭴ>, /ə̃/ <Ꭵ> (Silver & Miller, 1997). The vowel graphemes typically occur at the beginning of a word. These graphemes can be seen in Figure 9 above.

1.3.4.3. C GRAPHEMES

There is only one monoconsonantal grapheme in the Cherokee syllabary: <Ꮝ>, /s/. /s/ is used for consonant clusters and codas (Silver & Miller, 1997). This is the only grapheme that is not a full syllable, but rather functions as the onset or coda of a syllable. The grapheme is depicted above in Figure 9.

1.3.5. Sign Ordering

1.3.5.1. AS ARRANGED BY THE INVENTOR

Just as there are different graphemes between OCS and MCS, there are also different orderings of the graphemes. Upon the CS's creation, it was represented in OCS characters in the Sequoyan order, both originally devised by Sequoyah. Below in Figure 10, the Sequoyan order is seen in MCS and phonetic values (Scancarelli, 1996). Figures 6, 7, and 8 presented above are all in the Sequoyan order.

FIGURE 58. Sequoyah's alphabetical order (read left to right).

Figure 10. MCS and Phonetic Values in Sequoyan Order. Adapted from The World's Writing Systems (pg 589), by J. Scancarelli, Eds P. Daniels & W. Bright, 1996, New York, NY: Oxford University Press.

Worcester (1828a) states that "the arrangement of the characters, as made by the inventor, like that of other alphabets, is entirely without system (p. 162). Bender (2015) investigated the Sequoyan order by consulting with fluent Cherokee speakers in the EBCI to investigate possible mnemonic or semantic patterns. Only two possible patterns were found: 1) the first two graphemes representing the phonetic values /e/ and /a/ sound similar to /hi?a/, which is the first word of the first page in the New Testament in Cherokee meaning *this*, and 2) the sequence of graphemes representing the phonetic values <wu-we-tlv-ne-hi-ki> is similar to the Cherokee word for God, "uwe:tlanvhiki". These patterns can be seen in Figure 10 above. While some Cherokee words can be found in the Sequoyan order, both examples are pulled from Christianity and the Sequoyan order predates the Cherokee community's conversion to Christianity. This fact makes it unlikely that these 2 words were used as mnemonics in the Sequoyan order, and the historical explanation for the original ordering of the characters has been lost.

1.3.5.2. THE SYSTEMATIC ARRANGEMENT

The ordering of the characters that is common today is attributed to Worcester, as already noted, and as seen above in Figure 9; it is called the "systematic arrangement." The exact contributions of Worcester are debated, and my analysis in Chapter 3 will contribute to this debate supporting Sarbaugh & Walker's (1993) claim that Sequoyah created both OCS and MCS. The graphemes are now laid out into an alphabetic grid, arranged by vowel columns and consonant rows (Sarbaugh & Walker, 1993; Scancarelli, 1996; Bender, 2015). Bender (2015) proposes that Worcester likely arranged the Cherokee characters in this order to make them rhyme when read across.

1.3.6. Inadequacies of the Cherokee Syllabary

While the CS is an astounding invention, it has limitations in its ability to represent the spoken Cherokee language, as most writing systems do. Firstly, Sequoyah likely spoke the Overhill dialect, and therefore the CS is thought to be a better representation of the Overhill dialect rather than the Middle dialect. Secondly, the CS is allegedly unable to represent: 1) vowel length, 2) pitch, 3) intrusive *h*, 4) glottal stops, 5) tone, 6) the distinction between voiced and voiceless, and 7) the distinction between aspirated and unaspirated consonants. Lastly, not all words are CVCV, as one would expect from the phonetic values of the syllabograms; rather there can be complex onsets or complex codas in Cherokee syllable structure. For example, when writing the word for "apple" in the CS, one must spell it <sv-ka-ta>, or <ᏎᎧᏔ>, while the phonemic realization of the word is closer to /sə̃ːkʰta/. There is a orthographic surplus as an extra vowel is added to the spelling for the word *apple*, as one cannot represent a CC that does not contain an /s/ phoneme (Bender, 2015; Montgomery-Anderson, 2015; Herrick et al, 2015).

CHAPTER 2. WRITING SYSTEMS REVIEW & PROCESSES

To be able to understand and analyze the Cherokee writing system, we must understand the phenomenon of writing itself: what it is, the role it plays, the variant types of writing that exist, and the ways that writing develops. Written language is distinct from spoken forms of language, as writing is the representation of language by graphic symbols, indexes, or icons that allow the utterance to be recovered in the exact way it was recorded without the intervention of the utterer and must represent the sounds of the intended language (Daniel & Bright, 1996: 3; Rogers, 2005: 2). Writing is a fairly recent invention in human history, only occurring within the last five thousand years. While all humans can speak with the proper biological structures and linguistic input, humans only write through effortful studying; this makes writing a secondary process to spoken language (Daniels & Bright, 1996: 12; O'Grady et al, 1997: 532). Through writing, humans have been able to convey information over distances of place and time, allowing humans to retain information beyond what our memory could maintain (Rogers, 2005: 1).

There are three ways in which the written form of language can come about: 1) the idea and creation of writing can be invented as a new phenomenon, 2) the writing system may be borrowed from one language and applied to another, and 3) a new script can be created, with only the idea of writing being transferred (Rogers, 2005). The independent creation of a writing system is a rare occurrence throughout human history; only five writing systems are thought to have been created independently: Sumerian, Egyptian, Harappan, Chinese, and Mesoamerican scripts such as Olmec and Mayan (Rogers, 2005; Daniels & Bright, 1996). The borrowing of a writing system from one language to another is extremely common throughout history, and is

thought to be the main form of writing system innovation. The third form of the spreading of writing is through the idea of stimulus diffusion; stimulus diffusion is the adoption of the general idea of writing without the specifics of the writing system being transferred to represent the new language (Rogers, 2005: 4-5).

2.1. Review of Relevant Writing Systems

In this section I will be discussing the varieties of writing systems that exist, with the goal of illuminating which types of writing systems are pertinent to the analysis conducted in Chapter 3. Through section 3.1, it will become evident that five writing systems do not need to be exhaustively explored relative to OCS and MCS, while 3 varieties are crucial to my analysis of the CS. Table 1 below summarizes which writing system varieties are pertinent for my analysis, and which writing systems are unnecessary to discuss further. Writing systems that are deemed uninformative for my analysis will still be discussed below, as an explanation as to why they are unnecessary to further explore. Additionally, the table below provides a short description of grapheme correspondence, or what values typically correspond to graphemes.

Writing System Variety	Grapheme Correspondence	Relevant to Analysis
Syllabic	Syllable	Yes
Abugida	Mainly C, with secondary V notation	Yes
Mixed Writing Systems	Combination of 2 or more other varieties	Yes
Logographic	Word	No
Morphographic	Morpheme	No
Alphabetic	Segment (C, V)	No
Abjad	Only C segments, no V	No
Featural	Featurally related segments	No

Table 1. Writing Systems Correspondence and Significance

2.1.1. Logographic

Logographic writing systems are systems "whose basic functional units are interpreted as words" (Coulmas, 2003: 40). It is believed that early writing systems were logographic, with graphemes functioning iconicly but soon developing into indexical signs and later into arbitrary signs. As these systems developed over time, they became more complex and expanded beyond functioning solely as logographic systems (Daniels & Bright, 1996). The most iconic and widely discussed logographic systems include Pre-Cuneiform Sumerians, early Chinese, and early Egyptian (Coulmas, 2003). Logographic writing systems typically have a large number of graphemes because languages have many words, and each grapheme represents an individual word as a unit. Because of this, one would expect thousands of signs to represent the copious number of words in a language. To this point, there are about 6,000 characters in Chinese that are in common use at any point in time throughout history (Coulmas, 2003).

With this information in mind, we can begin to make inferences about Cherokee's typological behavior. As discussed earlier in section 1.3.1, many historians and scholars believe that Sequoyah's first attempt to represent the Cherokee language physically was captured through a logographic system, originally with pictographs that later developed into abstract symbols representing entire words (Foreman, 1938; Foster, 1885; Basel, 2007; Silver & Miller, 1997; Montgomery-Anderson, 2018; Walker & Sarbaugh, 1993; Bender, 2015). At this point, the story of the creation of the CS diverges; some say that Sequoyah shifted to a syllabic system because it was too cumbersome and difficult to memorize, while others say that he started from scratch once his work was burnt. While this idea of Cherokee writing origins is prolific in the literature, there is no evidence to support this narrative. Whichever story is historically accurate, all scholars agree that the supposed logographic system was eventually discarded and replaced with a separate, phonetic system.

Beyond the debated history surrounding the creation of the CS, one can examine the characteristics of OCS and MCS graphemes today. The number of graphemes in use for the CS is extremely informative when comparing the CS to a logographic system, as logographic systems require one grapheme for one word. As OCS had 86 graphemes and MCS has 85 graphemes, there would not be enough graphemes in the Cherokee writing system to have one grapheme represent an individual word in the language, expecting the Cherokee language to have a larger vocabulary than 86 words.

Because of the limited number of Cherokee graphemes, the history of the creation of the CS, and the lack of evidence for a logographic system, I conclude that it is that the CS, in either OCS or MCS formatting, does not behaves as a logographic system. As such, the analysis of the CS in Chapter 3 will not explore the possibility of the CS functioning logographically.

2.1.2. Alphabetic

As literate speakers of English are familiar with, an alphabetic writing system utilizes individual graphemes that represent an individual segment, either a consonant or a vowel (Rogers, 2005; Daniels & Bright, 1996). The most common examples of alphabetic writing systems include the Roman alphabet, the Greek alphabet, and the Cyrillic alphabet (Rogers; 2005). In the Roman alphabet used to represent English today, there are 26 graphemes; 5 graphemes corresponding to vowels, and 21 graphemes to represent the consonants of the language. The number of graphemes found in the Cherokee writing system present evidence that the CS is not a segmental writing system; as graphemes represent individual segments in alphabetic writing systems, one would expect a fewer number of signs that 86, as Cherokee does not have 86 individual segments in the language.

Throughout different points in history, the CS has been referred to as the "Cherokee Alphabet" (Summit, 2012; Worcester, 1828). If this title was intended to claim that the segments represent individual consonants or vowels rather than CV or V syllables, I have yet to find this connection. I believe that the CS was referred to as the "Cherokee Alphabet" at different points in history because white Europeans and Americans surrounded the Cherokee nation, and with an ethnocentric view assumed that the Cherokee Nation used a writing system derivative of their own alphabetic system. Another possibility is that when the term "alphabet" was used to refer to the CS, it was used as a broad term to refer to any writing system, rather than a specific type of writing system.

With that being said, there are 7 graphemes that do represent individual segments in the CS: <Ꭰ, Ꭱ, Ꭲ, ᎵᏍ, Ꮎ, ꭵ, ᏻ>, representing the phonemes /a, e, i, o, u, ə̃, s/. From the discussion in section 1.2.2, it is clear that vowel segments can behave as syllables in Cherokee, however it is unclear if /s/ is able to behave as a syllable. Based on the information that is currently available concerning Cherokee syllable structure, /s/ is only discussed in terms of being a part of complex onsets or as a coda. If this is the case, then the grapheme that represents /s/ would not be representing a syllable of the Cherokee language, but rather an individual segment. Therefore, while 84 of the MCS characters represent possible syllables of the Cherokee language, the 85th grapheme /s/ seems to be an outlier as it is a consonantal segment of the language rather than a syllable of the language.

Because of the low likelihood of the CS representing individual segments of the Cherokee language rather than entire syllables, and because of the lack of recognition within the writing systems literature of the CS behaving as an alphabet, I will not be discussing the CS in terms of an alphabetic writing system in Chapter 3.

2.1.3. Syllabic

Syllabic writing systems are similar to alphabets, with the main difference being that the graphemes do not represent individual segments, but rather represent syllables of the language. In order for a writing system to be purely syllabic, there must be no graphic similarities of characters that have phonetically similar values. In other words, all characters with the same value, /a/ for example, cannot all share the same anatomical feature, such as a spine seen in the character <s>. Commonly cited syllabic writing systems in use today are Japanese *Kana* and the CS; one of the most famous, historical examples was Linear B. There are 46 characters and a number of diacritics in the Japanese *Kana* syllabic system that represent V, CV, and CyV syllables in the Japanese language (Daniels & Bright; 1996). Linear B is a Mycenean script used to represent the Greek language, that was successfully deciphered in 1952. In the years 1550-1200 BCE, it is believed that Linear B contained 87 syllabic graphemes, with 5 signs representing vowels and 54 signs representing CV syllables (Rogers, 2005: 150).

The CS is continually referred to as a syllabic writing system, as the word "syllabary" is in the name of the writing system. Bright (2000), when comparing syllabic writing systems against abugidas, remarks that both Japanese *Kana* and Cherokee writing behave as typical syllabaries in that they have "no shared elements" (p.65). He examines the consonant graphemes containing the phoneme /k/, seen in Figure 11 below, and show each vowel accompanying the consonantal phoneme. There are no shared graphic elements corresponding to specific phonetic values between the consonants, leading Bright (2000) to claim that the CS and Japanese Kana are syllabic systems. It is important to note that Bright (2000) only examines MCS, and does not consider OCS.

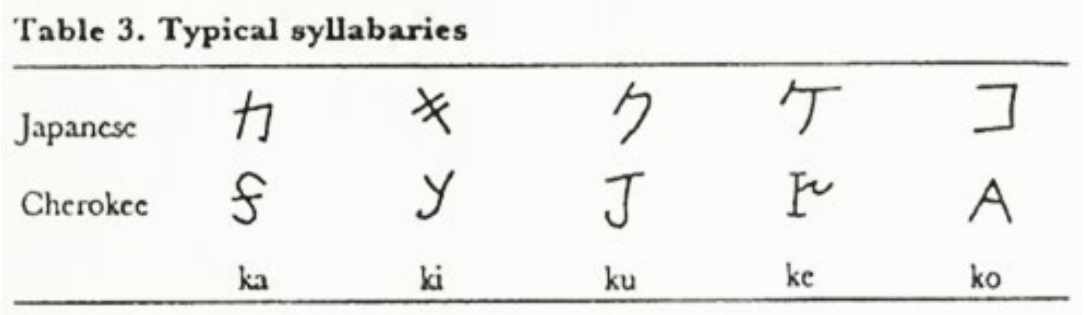


Figure 11. Lack of Systematic Similarities in MCS According to Bright (2000). Examples of non-graphic similarities in typically behaving syllabaries. Reprinted from Bright, William (2000). (pg 65) A Matter of Typology: Alphasyllabaries and abugidas. Studies in the Linguistic Sciences 30(1), pp. 63-73.

Bright (2000) is not the only scholar who reports the CS to behave as a syllabic writing system, other scholars who claim that the CS is a syllabic system include Foreman (1938), Foster (1885), Summit (2012), Basel (2007), Rogers (2005), Scancarelli (1996), and many more. While the CS has become the posterchild of typically-behaving syllabic writing systems in present use, only MCS is commonly discussed. Because of the vast literature, MCS linguistic analyses, and the absence of OCS linguistic analyses, syllabic writing systems will be extensively discussed in Chapter 3.

2.1.3.1. MORAIC

While most authors refer to Linear B, the CS, and Japanese *Kana* as syllabic writing systems, some authors believe that these systems are more likely moraic than syllabic; Rogers (2005) is one such author. The main distinction between a syllabic and moraic writing system is that the graphemes represent syllable weight, or morae, rather than entire syllables. According to Rogers (2005), morae typically consist of either CV or C segments of a syllable; and the C segment must be a coda, rather than a lone onset. In most languages that pay attention to syllable weight, long vowels receive two morae while short vowels receive one mora.

Following this logic, Rogers (2005) explains that both Japanese *Kana* and Cherokee are moraic rather than syllabic, as they consist of mostly CV graphemes with separate codal mora symbols, therefore having one mora for the CV grapheme and one mora for the coda grapheme. However, Cherokee only has one C grapheme, corresponding to /s/, but a number of possible codas beyond only the phoneme /s/; not only that, but the /s/ grapheme is commonly used to make complex onsets. This misaligns with Rogers moraic breakdown of Cherokee, as codal /s/ should have a mora but complex onset /s/ should not have an additional mora. Furthermore, other codas exist in Cherokee, and therefore should have an additional mora, but no additional C graphemes exist in the CS.

Another important distinction to consider in syllable weight is vowel length; in Cherokee, there are long and short vowels. Rogers (2005) attests that long vowels receive two morae while short vowels receive one mora. If this is the case and Cherokee was a moraic writing system, we would expect separate graphemes for CV sequences with short vowels and CV sequences with long vowels. Yet this is not the case, instead the same grapheme is used for both CV and CV: sequences, not making a moraic distinction. For these reasons, I do not believe that a moraic system is a better representation of the behavior of CS than a syllabic system. As such, I will furthermore discuss only syllabic writing systems.

2.1.4. Morphographic

A morphographic writing system is similar to a logographic writing system, with the main distinction being that graphemes correspond to individual morphemes rather than to whole words. The boundary between morphographic and logographic writing systems is blurred, and scholars categorize writing systems as morphographic or logographic according to their own

individual, specific definitions. For example, Rogers (2005) believes Chinese writing is morphographic, while Daniels & Bright (1996) pursue the idea that Chinese writing is more logographic in nature. The distinction between whether a grapheme represents an individual word or an individual morpheme is difficult to discern, and there is likely overlap in many writing systems. Most words behave as free, root morphemes and so, by definition, a character can be both a morphogram and a logogram simultaneously.

Cushman (2011) claims that within the Cherokee writing system "one character not only represents one sound unit but also can represent meaning," suggesting that Cherokee graphemes are not only phonetic but also morphographic. Figure 12 below shows a demonstration of Cushman's analysis. While Cushman provides a detailed description of the phonological environments in which these four Cherokee graphemes occur, I remain unconvinced that the individual graphemes correspond to morphemes. For example, when considering the character <Ꮢ> for the phonetic value /e/, she describes the grammatical function partly with the description "frequently used in combination with consonants" (p. 270). It is true that <Ꮢ>, or /e/, typically occurs with consonants, but it does not speak towards the morphemic functioning of the character.

Character and phonetic	Grammatical function and/or semantic meaning
Ꭱ e	Frequently used in combination with consonants. Verb prefix to show passive and imperative; verb suffix to show dative and benefactive constructions; and to mean repeatedly (Feeling & Pulte, 1975, p. 89).
Ꭰ a	Third person as noun and verb prefix (1). Verb suffix showing present tense (1).
Ꮃ la	Locative prefix perhaps meaning down, as in eladi (199), foot ilasihdi (202).
Ꮅ tsi	Root word meaning egg as in uwetsi, and child (315) and mother as in utsi (210). Can also be first person, singular, pronoun subject for I, as in tsiwoni or I speak (134).

Figure 12. Morphographic Analysis of Cherokee According to Cushman (2011). Adapted from Cushman, Ellen (2011). (pg 270). The CS: A Writing System in its Own Right. Written Communication, 28(3), pp. 255-281.

When analyzing the character <Ꮅ>, for the phonetic value /tsi/, Cushman (2011) identifies that it behaves as the root morpheme in the word <u-we-tsi> and as the root morpheme in the word <u-tsi>. However, /etsi/ is considered the root of the word rather than the individual syllable /tsi/. Feeling & Pulte (1975) discuss the ways in which "nouns referring to human beings are inflected for person and number by the use of [a] set of prefixes" and that "inanimate nouns may take the same prefixes" (p. 308). This suggests that /u/ or /uw/ would be the third person singular pronominal prefix, making /etsi/ the root for the word *egg* or *child*.

If this is the case, the grapheme <Ꮅ>, representing the phonetic value /tsi/, only represents part of the root morpheme, with the phoneme /e/ being omitted. Contrary to Cushman's (2011) claim, this provides evidence that the grapheme is not morphographic. It is difficult to discern whether this analysis is identifying previously unknown morphological functions of MCS, or if this analysis is rather more of a description of where MCS graphemes appear in the Cherokee language.

Further evidence that MCS is not a morphographic writing system comes from Montgomery-Anderson's (2018) discussion of the verb "I understand." Because Cherokee is polysynthetic, the syllabary is not able to accurately parse all morphemes along grapheme boundaries.

Example (1): "goliga"
<AᎵᏕ>
<Go-li-ga>
/gowli:gɑ/
<g-oliga>
1sg-"understand"
"I understand"

/owli:gɑ/ is a morpheme that corresponds to the verb stem "understand," while the single phoneme /g/ corresponds to the first person singular pronoun morpheme "I." When written in Cherokee, the word is broken down into three syllable graphemes: A <go>, Ꮅ <li>, Ꮥ <ga>. Within the first Cherokee grapheme of this word, A <go>, the morpheme for first person singular and the first vowel of the verb stem /owli:gɑ/ are represented, demonstrating that a full morpheme and part of a second morpheme are both represented in the individual grapheme A <go> (Montgomery-Anderson, 2018). If morphemes straddle syllable boundaries, it is unlikely that graphemes have a morpheme correspondence, and therefore it is unlikely that Cherokee is a morphographic writing system.

2.1.5. Abjad

Abjads, also known as consonantaries, are a variety of writing system in which each symbol corresponds only to a consonant of the language, and vowels are not represented (Rogers, 2005; Daniels & Bright, 1996). Abjad writing systems are most commonly used for Semitic languages, including Hebrew. Early Hebrew was an Abjad that only represented

consonants, but over time the process of vowel pointing took place, allowing secondary vowel notations to be added to the original consonant abjad characters to indicate which vowel is intended to accompany the consonant (Rogers, 2005). To my knowledge, no scholar has argued that the CS behaves as an abjad; Because of this, the possibility of the CS as an Abjad will not be discussed in detail in Chapter 3, with the exception of the concept of vowel diacritics, which will be relevant to the Chapter 3 analysis.

2.1.6. Abugida

An Abugida is a writing system that writes CV sequences as a unit: "each character denotes a consonant accompanied by a specific vowel, and the other vowels are denoted by a consistent modification of the consonant symbols" (Daniels & Bright, 1996: 4). Each basic sign corresponds to a consonant, and a diacritic is commonly used to mark the vowel. It is important to note that the secondary vowel notations on the main consonant grapheme are consistent modifications, not random (Daniels & Bright, 1996). A well-known example of an Abugida writing system is Devanagari, the ancient Brahmi writing system used to represent Sanskrit. In Figure 13 to the right, one can identify the consistent /k/ consonantal grapheme being altered through the addition of a secondary vowel diacritic to produce the CV sequences: /ka/, /ki/, /ku/, etc.

Free	*Bound*	*Bound with <k>*
a		ka
अ	—	क
i		ki
इ	ि	कि
u		ku
उ	ु	कु
r̥		kr̥
ऋ	ृ	कृ
l̥		kl̥
ऌ	ॢ	कॢ
e		ke
ए	े	के
o		ko
ओ	ो	को

Figure 13. Abugida Features of Devanagari. Adapted from Writing Systems: A Linguistic Approach. (pg 215) By Rogers, 2005, Malden, MA: Blackwell Publishing.

While the possibility of the CS behaving as an Abugida either in OCS or MCS has not been discussed in the literature, as the Cherokee language has come into modern times new diacritics have been created to assist in phonetically representing the language. Once such example comes from Herrick et al (2015), who created tonal diacritics for the Overhill dialect of the Cherokee language through the Cherokee Tone Project. As discussed in Chapter 1, the CS is inadequate in representing the Cherokee language fully in a number of ways, including tone, which is a crucial feature of the spoken language as it can make phonemic distinctions (Herrick et al, 2015). The CS and standard Romanization of the Cherokee language do not distinguish vowel length nor tone. Herrick et al (2015) recognize four other attempts to adjust and include

new orthographic representations, including additional V graphemes and secondary diacritics, to include this crucial information to aid in language learning and reliability.

The goal of the Cherokee Tone Project was to raise awareness of Cherokee vowel length and tonal distinctions to ease the language learning process and to create a system of diacritics to represent this information. Herrick et al do not document how widely accepted their diacritic system has been since its creation in 2015. Their explanation of the most well-known Cherokee representation that varies from the CS or the standard Romanization is included in Appendix B.

While a number of scholars have altered the CS in an attempt to have the writing system better represent the pronunciation of Cherokee, these systems are not widely accepted and all vary significantly from one another. Notably, all five of these systems have been developed as an afterthought to adjust or specify the phonetic realization of the Cherokee language. These developments were introduced years after the creation of CS in the early 19th century; Feeling & Pulte created their secondary diacritic notation system in 1975 as they created a Cherokee dictionary, Scancarelli developed a secondary notation system in 1987 as she completed her dissertation, the occasional UCLA papers use a separate diacritic notation system developed in 1996, Harris created auxiliary diacritics in 1999, Montgomery-Anderson developed his Cherokee diacritic system in 2008, and most recently the Cherokee Tone Project developed their vowel length and tonal diacritic system in 2015. The earliest of these systems, that of Feeling & Pulte in 1975, was introduced to the Cherokee writing system 154 years after its invention. These were effortful processes with the intention of specifying information that is omitted in the CS and standard Romanization of the Cherokee language.

These supplementary systems are helpful for language learning and phonetic description, but no scholars have investigated MCS or OCS to see if any diacritics were originally created for

the CS in 1821, and have been since lost. When exploring the possibility that the Cherokee writing system could have features of an abugida writing system, specifically secondary vowel diacritics, one would look for systematic or shared elements. This analysis will be discussed in depth below in Chapter 3.

2.1.7. Featural

The concept of featural writing systems was created in 1985 by Geoffrey Sampson. According to Sampson (1985), a featural writing system is one that relates the graphic design of the characters to the phonological features of the intended phonetic value. The existence of this variety of writing system is debated, and the only example is Korean Hangul (Rogers, 2005). Figure 14 below depicts the overlap of the Hangul graphemes and the articulatory phonetic process to produce the phones [m, s, n, k, ʔ].

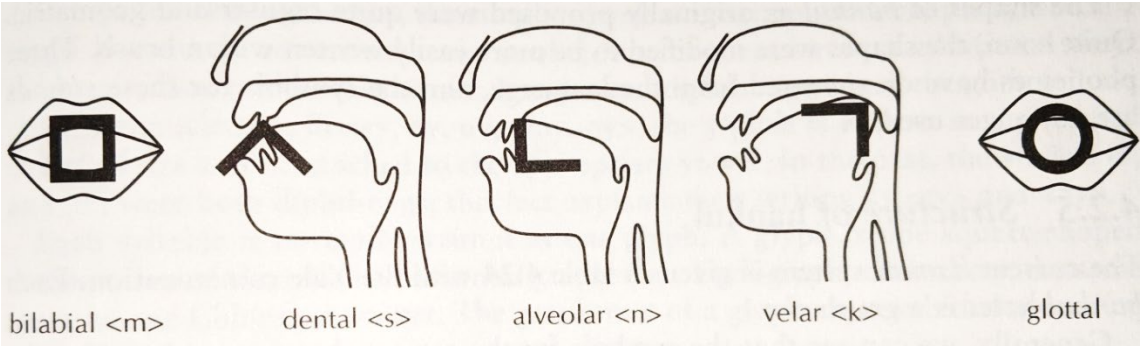


Figure 14. Featural Alignment of Korean Hangul. Adapted from Writing Systems: A Linguistic Approach. (pg 71). Rogers, Henry (2005). Malden, MA: Blackwell Publishing.

While there appears to be a relationship between the phonetic articulatory process and the grapheme shape, Rogers (2005) is unconvinced this is purposeful and comprehensive throughout

the Hangul writing system. This is an interesting and hotly debated form of writing, but if featural writing systems do exist, they are extremely rare; this is likely because people's conscious awareness of phonetic articulatory processes are largely inaccurate. Because of the rarity of featural writing systems, and the lack of evidence suggesting the CS may behave as a featural writing system, this possibility will not be discussed in Chapter 3.

2.1.8. Mixed Writing System

Mixed systems are common and incorporate principles from a variety of writing system types into one system over the course of time, history, and community interactions (Coulmas, 2003); examples of mixed writing systems include Linear B and Japanese. Linear B, already mentioned above as a type of syllabary, was used to represent Mycenean Greek before the creation of the Greek Alphabet. Linear B contains 87 syllabograms and over 100 logograms, equaling approximately 200 graphemes in total (Daniels & Bright, 1999). Japanese is a mixed writing system that includes *kana* syllabograms and historically Chinese logograms (Rogers, 2005).

Because writing systems are a technology, and are dependent on the language and culture of the society in which it is employed, writing systems are highly susceptible to change over time as the society it functions in changes. Mixed writing systems are a result of the intricate and significant intertwining of linguistic, cultural, and societal information that is essential for the creation and maintenance of a writing system. While the CS behaves logographically today due to the use of logograms such as <$> and Arabic numerals, I believe it is extremely likely that the CS either previously behaved as a mixed writing system, or currently behaves as a mixed writing system mixing the varieties of an abugida with a syllabary, due to the tumultuous cultural and

political environment in which the CS was created and disseminated. Because of this, mixed writing systems relative to the CS will be discussed at length in Chapter 3.

2.2. Developmental Processes of Writing Systems

2.2.1. Rebus Writing

As discussed briefly in section 2, there are three known ways in which a writing system can come about, through 1) independent creation, 2) as a borrowed system, and 3) through stimulus diffusion. These are the three forms of writing system creation and adoption that have been most documented throughout history. However, writing systems, whether created or borrowed, must adapt and develop as the society and the language develop. In this section, I will discuss a number of developmental processes that can occur within writing systems, which will be essential to understanding the transition of the CS characters from OCS to MCS.

The first developmental process that I will discuss is the rebus principle. The rebus principle, sometimes referred to as phonetic extension, is the process of using a symbol that represents one phonetic value for a particular word, and extending this symbol to represent a semantically unrelated word that shares the same phonetic value (Rogers, 2005: 32). It is common for the pictorial quality of the original signs to be lost, facilitating the "phonetic transfer to semantically unrelated words" (Coulmas, 2003: 40) Homophony is a common phenomenon in languages, making rebus writing a productive form of writing expansion (Rogers, 2005; Daniels & Bright, 1996).

One example of rebus writing in Sumerian Cuneiform involves the phonetic value /ba/. One grapheme was used to represent the word "tool", pronounced as /ba/; another separate word "to disturb" was a homophone for the word "tool" and was also produced as /ba/. Because of

this, the original symbol to represent the word "tool" was phonetically extended to also represent the word "to disturb," even though they are semantically distinct words. The Sumerian language had a number of homonyms and near homonyms, making rebus writing incredibly useful. Through rebus writing of Sumerian Cuneiform, a small number of signs were used to represent a large number of words.

The rebus principle was not only utilized for Sumerian, but it is believed that phonetic extension was a developmental process used for all four forms of independently created and deciphered scripts: Sumerian, Egyptian, Chinese, and early Mesoamerican scripts (Zapotec, Epi-Olmec, and Mayan). In three of the languages represented by these scripts, Sumerian, Chinese, and Mayan, most words were comprised of single syllables, meaning that pictographic signs were used to represent monosyllabic words. This monosyllabic language structure facilitated rebus writing, as the monosyllabic grapheme could easily extend to represent the individual syllable.

Daniels & Bright (1996) have observed a consistent characteristic of these three independently invented scripts: they all transitioned from a logography to a syllabary, and never to an alphabet. However, this pattern is not universal as Egyptian did not follow this course. They hypothesize that this stems from how people use and process language on a conscious level, in that most people consciously hear syllables rather than individual segments. Not only that, but all three of the languages cited—Sumerian, Chinese, Mayan—share the feature of having mostly monosyllabic lexical items. This allowed for a seamless transition from monosyllabic pictographs to be phonetically extended to function as syllabograms. As such, the rebus principle is a foundational developmental process for the creation and expansion of independently created writing systems (Daniels & Bright, 1996).

This pattern of independently created writing systems transitioning from logographic systems to syllabic systems could support to the claim that Sequoyah indeed created the CS without the assistance of another literate individual after getting the idea of writing from European colonizers through stimulus diffusion. As discussed in Chapter 1, several sources claim that Sequoyah originally devised a logographic writing system to represent the Cherokee language, but replaced this system with a syllabary instead. It is important to remember that there is no evidence to support that the CS originated as a logographic writing system.

Given the examples like Sumerian Cuneiform and Mayan, which transitioned from a logographic system to mixed logographic and syllabic systems, it is plausible that the CS may have also transitioned from a logographic system to a syllabic system, rather than to an alphabetic system. The supposed logographic graphemes have been lost to history or may never have existed at all, but this general course of development is not one that can be discarded for the CS.

2.2.2. Syllabic Writing System Development

While most resources suggest that the CS originated as a logographic system that later developed into a syllabic system, there is no solid evidence that a logographic system of Cherokee writing existed, now or in the 19th century. Previously popular views claimed that all writing systems develop in a linear fashion, starting as pictographic, moving to logographic, then syllabic, and finally ending as alphabetic systems (Tylor, 1865; Gelb, 1963). As such, it was believed that syllabic writing systems can never develop from alphabetic systems (Sethe, 1939). However, Justeson & Stephens (1994) expose this idea as invalid; in fact, they provide evidence of a number of syllabic writing systems that emerged from alphabetic systems. Such case studies

include the Caroline Islands script, the Indic script, the Winnebago Syllabary, and Old Persian, all syllabaries developed from alphabets.

Justeson & Stephens (1994) explain the mechanisms utilized to develop a syllabic writing system from an alphabet, emphasizing the importance of regularized patterns of pronunciation of alphabet letters. In many cases, these regularized phonetic pronunciations of alphabetic letters are interpreted as syllabic values for the written graphemes. For example, in English we refer to the grapheme <b> as /bi/ and the grapheme <f> is pronounced as /ɛf/, syllabic pronunciations of the alphabet letters intended to represent segments. As writing systems are taught, the individual graphemes correspond to the phonetic syllabic value, and students associate the grapheme with a syllable rather than with an individual segment.

While the exact mechanisms discussed by Justeson & Stephens (1994) do not directly apply to the CS, it does provide evidence that syllabaries can develop from alphabets. This allows for the possibility that Sequoyah witnessed English being written, possibly planting the idea that graphemes could correspond to syllables. This would be an example of stimulus diffusion, as the idea of writing was spread from the colonizers to the Cherokee, with the exact grapheme correspondence not being adopted.

2.2.3. Convergence & Divergence

Convergence and divergence are opposing graphemic developmental processes, that refer to the altering of individual graphemes over the course of time. Mora-Marín (2003) discusses formal convergence and divergence relative to the Mayan script. Convergence is when two signs that are originally distinct become graphically identical. The final sign created through the process of convergence then has the phonetic value of both original signs. Convergence may

occur between two signs, or amongst more than two signs (Lacadena, 1995). It is important to note that the two signs that undergo the process of convergence may or may not be related before convergence takes place. Divergence is the opposite of convergence, meaning that the two original signs become more distinct as time passes. The signs that diverge may originally be phonetically or graphically related. Both convergence and divergence are developmental process that are recorded within the Mayan writing system (Mora-Marín, 2003).

2.2.4. Typology of Graphic Changes

Relevant graphic operations for the discussion in Chapter 3 include substitution, deletion, and rotation. Through the processes of substitution, deletion, and rotation, the CS graphemes diverge in appearance. Mora-Marín (2016) discusses these three graphic changes in-depth in relation to Mayan graphemes, citing Lacadena (1995) who recognizes 6 pertinent types of graphic change: (1) blending, (2) relocation, (3) rotation, (4) introduction of a new graphic element, (5) loss or omission (deletion) of old graphic elements, and (6) substitution of graphic elements. The operational process of rotation on a grapheme involves turning the whole grapheme as it originally existed. The operational process of deletion entails the removal of specific graphic elements within a grapheme. Finally, the operational process of substitution allows for the replacement of original graphic elements with a distinctly different graphic feature. With the utilization of these graphic changes, the CS graphemes diverge as they become more distinct over time.

2.3. CONCLUSIONS

By examining these eight varieties of writing systems, we are able to better understand the features and distinctions between writing systems. This allows us to discern which writing

systems are essential to address in the independent analysis of the CS following in Chapter 3. Based on the logistics of the writing systems, scholarly arguments pertaining to the CS, and the historical context of the CS, we are able to dismiss five writing systems as viable alternatives for the origin of the CS; the five writing systems that will not be exhaustively explored in Chapter 3 include 1) logographic, 2) morphographic, 3) alphabetic, 4) abjad, and 5) featural writing systems. Rather, my analysis in Chapter 3 will focus on the features that the CS displays, whether represented in OCS or MCS, of the following writing system varieties: 1) syllabic, 2) abugida, and 3) mixed writing systems. The idea of divergence through the graphic changes of deletion, substitution, and rotation will also be discussed relative to the development and transformations of the CS.

CHAPTER 3. ANALYSIS OF CHEROKEE GRAPHIC FORMS

3.1. INTRODUCTION

In Chapter 2 we explored the literature surrounding various types of writing systems, and how scholars classify the CS. The CS is most often referred to as a syllabary, with newer modifications to the writing system adding secondary notation to indicate vowel length and tone. Few scholars have analyzed the Cherokee writing system to confirm how the CS functions, with Bright (2000) providing a pattern aligning with a syllabic system, and Cushman (2011) analyzing graphemes as morphemic or morphographic. Other scholars rely on resources and historical context to support the claim that the CS functions as a syllabic writing system. However, when the CS is discussed and analyzed, only MCS is examined.

Because few analyses of Cherokee graphic forms have been conducted, I intend to fill this gap in the literature by completing a comprehensive, independent analysis of the Cherokee writing system, both in the forms of MCS and OCS. My research began with a simple question: does the Cherokee writing system function, structurally, as a syllabary? Yet, this question has been more difficult to answer than I anticipated; many complicating factors arose as I began to conduct research and begin my study. The CS was created in a turbulent cultural and political environment, and most documentation is recorded through a European point-of-view, as Cherokee writing was only newly created. Not only that, but, as we have seen in Chapter 1, there are multiple iterations of the CS: original CS characters and modern CS characters, and the transition from OCS to MCS is undocumented and rarely discussed. To further complicate the

situation, there are varying orders of the characters: the original Sequoyan order, and the modern alphabetic Worcester ordering.

While my analyses do not provide an easy, one-size-fits-all answer to the research question, it does provide compelling evidence that OCS and MCS do not function as identical writing systems. Furthermore, OCS appears to not function as a pure syllabary, as suggested in Chapter 2; there are clear systematic similarities between graphic shape and phonetic values, suggesting OCS behaves as a mixed system. As my analysis is innovative in its application to the CS, there is a plethora of opportunities to test and expand upon the present work in the future, as I discuss in Areas for Further Research.

3.2. Modern Cherokee Writing

3.2.1. Calligraphic Terminology

To address to what extent the Cherokee writing system functions as a syllabary, I first investigated the MCS form of Cherokee, as MCS is the only form of the CS discussed in the literature. I conducted an analysis of the graphic forms of the MCS characters, borrowing terminology commonly used in calligraphy to identify the anatomical parts of graphemes. My analysis required 11 calligraphic terms already in use, as MCS graphemes look very similar to characters found in the Roman alphabet, and two newly coined terms. The two calligraphic terms created for this study are 1) wave and 2) cup; the formal feature of a wave is unique to the OCS. A summary of the anatomical terms is provided below in Table 2.

Anatomical Feature	**Definition**	**Example**
stem	Main vertical stroke	T
Bar / *wave*	Horizontal stroke	t
arm	Reaches up or out	k
leg	Extends down	R
bowl	Curved, closed stroke	D
cup	Curved, open stroke	
spine	Curved, central stroke	S
loop	Full circle	
link	Connects parts of the character	
title	Dot	i
ear	Small, projectile stroke	
Shoulder	Secondary, curved stroke	h n

Table 2. Summary of Calligraphic Terminology. used to identify anatomical parts of the CS graphemes.

Most graphemes typically have main strokes, which are the crutch of the character's shape. Anatomical terminology used to identify main strokes of graphemes include: 1) stem and 2) spine. A stem is the main stroke that runs vertically or diagonally in upright graphemes; a stem can be found in the grapheme <t> as the main vertical stroke, and in the character <V> as two diagonal main strokes. Spines are only seen in the roman alphabet in the grapheme <S>, and is the curved central stroke that depicts the human spine (Winegeart, n.d.).

The second category of calligraphic terminology utilized is curved strokes; there are a number of curved strokes that are essential for my analysis, including: 1) shoulder, 2) loop, 3) bowl, and 4) cup. A shoulder is the curved secondary stroke found in the graphemes <h> and <n>, and depicts the human shoulder. Loops are completed circles of a grapheme and are extremely rare in the Roman alphabet; the best example is exemplified in the character <g>. The final term borrowed from calligraphy to identify secondary curved strokes is bowl; a bowl is a curved, closed stroke, seen in the characters <D>, <B> and <b> (Winegeart, n.d.). While these three terms were borrowed from calligraphy, I coined the term cup. A cup is similar to a bowl, but is an open stroke. Examples of a cup include the graphemes <c> and <u>.

An additional stroke commonly used in writing systems are straight secondary strokes, including: 1) arms, 2) legs, and 3) bars. An arm is a secondary stroke that reaches out or up, and is typically only attached on one end of the stroke. Characters that contain an arm include <k> and <Y>. A leg is similar to an arm, with the main distinction being that a leg extends down; <R> and <k> both contain an anatomical leg. Finally, bars are horizontal strokes across or above the main stroke, as seen in characters <t>, <T>, and <G> (Winegeart, n.d.). I created a derivation for the term bar, called a wave; a wave is a bar that is curved rather than straight. There are no waves in the Roman alphabet, only in Cherokee depicted in the character <ꮣ>.

The final category of anatomical terms refers to small, final strokes: 1) ear, 2) link, and 3) title. An ear is a small, projectile stroke seen in the characters <ᏼ> and <Ꮅ>. A link is a stroke used to connect two already existing pieces, such as in the characters <g> or <Ꮋ>. Finally, a title is used to refer to the small dot above the graphemes <j> and <i> (Velarde, n.d.; Valeanu, 2011; Schenker, 2018).

3.2.2. Analysis of MCS Graphic Forms

To analyze the graphic forms of MCS characters, I applied the above calligraphic anatomical terminology to each of the 85 MCS characters. In Table 3 below, each MCS grapheme is depicted and anatomically described. I looked for shared graphic features as a means to categorize the MCS graphemes, however no significant graphic forms were identified. Because MCS graphemes do not share anatomical features that align with particular phonetic values, **I conclude that MCS behaves as a syllabic writing system**. This structural, linguistic analysis lends empirical rigor to the traditional designation of MCS as a syllabary.

Phonetic value (standardized roman alphabet)	**MCS**	**Anatomy**
A	D	Bowl, stem
E	R	Bowl, leg, stem
I	T	Stem, bar
O	ᏼ	Loop, link, bar, stem, cup
U	Ꮋ	Loop, link, cup
V	i	Stem, title
Ga	S	Spine, 2 cups, bar
ka	ᏻ	Loop, cup
Ge	Ꮾ	Spine, stem
Gi	Y	Cup, 2 stems
Go	A	2 stems, bar
Gu	J	Bar, cup, stem
Gv	E	3 bars, stem
Ha	Ꮿ	Loop, bar, link, stem
He	Ꮲ	Stem, cup
Hi	Ꮄ	2 cups, bar, cup
Ho	Ꮒ	Stem, bar
Hu	Ꮁ	Stem, bar
Hv	Ꮿ	Cup, loop, bar, link
La	W	4 stems
Le	Ꮄ	Loop, Cup
Li	Ꮅ	Stem, cup
Lo	G	Cup, stem
Lu	M	4 stems
Lv	Ꮉ	Spine, stem, cup
Ma	Ᏸ	Loop, ear, spine, 2 stems, bar
Me	Ꮎ	Loop, link, stem
Mi	H	Bar, 2 stems
Mo	Ꮟ	Bar, stem, cup, ear
Mu	Ꮻ	Bar, cup, 2 stems
Mv	-	-
Na	Θ	Loop, bar
Hna	Ꮧ	Bar, 2 stems, cup
Nah	G	Bar, cup

Ne	ᔑ	2 cups, stem
Ni	ᕼ	Stem, shoulder
No	ᙆ	2 bars, stem
Nu	ᖃ	2 bars, stem, 2 cups
Nv	ᘐ	Spine, loop
Qua	ᙀ	2 bars, stem
Que	ᔍ	2 cups
Qui	ᘿ	Loop, bowl, cup
Quo	ᙎ	Cup, spine, 2 stems
Quu	ᔊ	2 cups
Quv	ᕄ	2 cups
S	ᔕ	Loop, link, cup
Sa	ᕲ	Cup, bar
Se	ᔦ	Bar, arm, stem
Si	ᑲ	Stem, bowl
So	ᖨ	Stem, spine
Su	ᘎ	Loop, 2 spines, cup
Sv	ᖇ	Cup, leg, stem
Da	ᑌ	Stem, cup, bar
Ta	ᗯ	4 stems
De	ᔆ	2 bars, spine, 2 cups
Te	ᒐ	Bar, stem, cup
Di	ᒍ	Stem, leg, cup
Ti	ᒎ	Bar, stem, leg, cup
Do	ᐯ	2 stems
Du	ᔑ	Spine, 2 cups
Dv	ᘏ	Loop, link, cup

Dla	ᘰ	3 loops, link, 2 spines
Tla	ᒪ	Stem, bar, cup
Tle	ᒪ	Bar, stem
Tli	ᒐ	Cup
Tlo	ᖻ	Loop, bowl, stem
Tlu	ᘮ	Bar, link, cup, loop
Tlv	ᑭ	Bowl, stem
Tsa	ᑕ	Bar, cup
Tse	ᐯ	2 stems, bar
Tsi	ᕿ	2 stems, shoulder, ear
Tso	ᛕ	Stem, arm, leg
Tsu	ᑯ	Loop, stem
Tsv	ᑖ	2 waves, cup
Wa	ᘉ	Loop, bar, ear
We	ᘻ	2 loops, link, cup
Wi	ᘓ	Spine, loop
Wo	ᘐ	Loop, cup
Wu	ᘁ	Loop, cup
Wv	ᘃ	Loop, cup
Ya	ᔓ	2 cups, wave
Ye	ᕰ	2 bowls, stem
Yi	ᘌ	Link, bar, cup, arm
Yo	ᕷ	Cup, shoulder, stem
Yu	ᘖ	Bar, cup, stem, wave
yv	ᗷ	Stem, 2 bowls

Table 3. Anatomical Features of MCS.

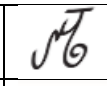
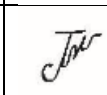
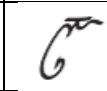
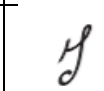
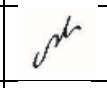
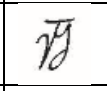
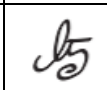
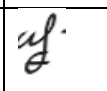
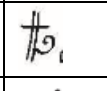
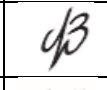
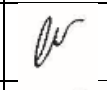
3.3. Original Cherokee Writing

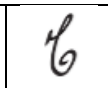
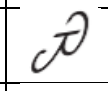
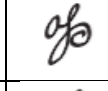
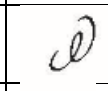
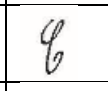
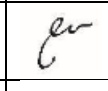
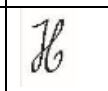
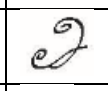
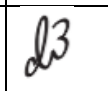
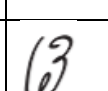
3.3.1. Analysis of OCS Graphic Forms

While my analysis of MCS validates the literature's description of MCS behaving as a syllabic writing system, as no systematic graphic similarities were found among characters with shared phonetic values, no linguists have performed an analysis of the graphic forms of OCS. To investigate OCS, I applied the calligraphic terms discussed in section 3.2.1 to the OCS graphemes. Table 4 below includes a depiction of all OCS graphemes as well as their anatomical descriptions.

Phonetic value (standardized roman alphabet)	**OCS**	**Anatomy**
A		2 Cups, 3 loops, 2 spines, link
E		4 loops, 1 cups, 2 spines, 3 links
I		2 loops, 1 spine, 1 link, 1 cup
O		2 spines, 2 cup, 2 loops, 2 stems, bar
U		2 loops, 2 stems, 1 spine, 1 cup, bar
V		Bar, loop, stem, cup, 2 links
Ga		1 loop, 2 bowls, 1 cup, 2 spines
ka		2 loops, 1 cup, 1 link
Ge		2 loops, 2 spines, 2 links, 3 cups, stem

Gi		3 stems, 2 loops, 1 link, 1 cup, bar
Go		Bar, 2 stems, 2 spines, 2 cups
Gu		stem, loop, link, cup
Gv		Bar, spine, 2 loops, 3 cups
Ha		2 spines, 1 link, 2 loops
He		1 loop, spine, link, stem, 4 cups
Hi		3 cups, 1 spine, stem
Ho		2 loops, 2 cups, 1 spine, 2 stems, 1 link, bar
Hu		1 loop, bar, 2 stems, ear, 2 cups
Hv		2 loops, 1 spine, 2 links, 1 cup
La		3 loops, 2 spines, link

Le		Bar, 2 cups, spine, stem
Li		2 spines, cup, stem, bar
Lo		Bar, 2 stems, spine, cup
Lu		Stem, link, spine, cup, loop
Lv		2 loops, 1 cups, 2 links, stem
Ma		2 stems, 2 spines
Me		Loop, 3 stems, link, bar, cup
Mi		Bar, loop, spine, cup, link
Mo		Loop, 2 cups, 2 stems, bar
Mu		Bar, 2 stems, loop, link, 2 cups, spine
Mv		Spine, loop, link, bar
Na		Bar, 2 loops, spine, 2 cups
Hna		2 stems, bar, cup
Nah		Loop, 2 stems, 2 bars, 1 cup, spine
Ne		Loop, 2 stems, cup bar
Ni		3 cups, link, stem
No		Loop, link, spine
Nu		Spine, 3 stems, loop, cup, bar link
Nv		bar, cup, spine, loop, 2 stems, spine, link

Qua		2 stems, link, loop, cup
Que		Bar, 2 stems, 2 cups
Qui		3 loops, link, cup, spine
Quo		2 cups, link, spine, stem, loop
Quu		Loop, 2 cups
Quv		2 bars, stem, loop
S		Stem, cup
Sa		2 cups, bar, stem, cup
Se		Stem, loop, cup
Si		Loop, 2 cups, stem
So		Loop, 2 links, stem, spine, bar
Su		2 spines, loop, link, cup
Sv		Bar, 2 stems, 2 links, spine, loop
Da		2 loops, bar, 2 stems, spine, cup
Ta		2 cups, stem, spine
De		3 cups, link, loop
Te		Loop, stem, link, 3 cups, bar
Di		2 loops, link, bar, 2 stems, cup
Ti		Loop, stem, 2 links, 2 cups

Do		Loop, 3 cups, link
Du		2 loops, bar, link, 2 cups
Dv		Loop, link, 2 stems, 2 cups, bar
Dla		2 stems, cup, link, 2 loops, spine
Tla		Stem, loop, link, spine, cup, 2 stems, link, cup, bar
Tle		2 stems, loop, link, 2 cups
Tli		Bar, 2 stems, link, loop, cup
Tlo		Cup, 2 stems, bar, spine
Tlu		2 loops, 2 links, stem
Tlv		3 loops, spine, 2 cups, link
Tsa		2 loops, link, 2 stems, spine, bar
Tse		3 loops, 2 cups, link, 2 spines
Tsi		2 stems, spine, bar, 2 cups
Tso		3 stems, 2 cups

Tsu		Link, 2 stems, cup, 2 bars, loop
Tsv		2 cups, stem, loop, link
Wa		2 spines, 2 cups, loop, 2 stem bar, link
We		3 loops, 2 links, cup, spine
Wi		2 stems, 2 spines, loop, 2 cups, link
Wo		2 loops, link, cup
Wu		Spine, 2 loops, 2 cups
Wv		2 spines, cup, stem, loop
Ya		Loop, link, cup, 3 stems, wave, 2 cups
Ye		2 bowls, loop, 2 cups
Yi		Loop, link, spine, cup
Yo		3 cups, link, spine, loop
Yu		2 loops, 2 spines, 2 stems, 2 cups
yv		3 loops, 2 spines, link, cup

Table 4. Anatomical Analysis of OCS Graphemes.

The use of the calligraphic terminology to identify the anatomical features of the graphemes was extremely useful for OCS, because OCS characters do not resemble characters found in the Roman alphabet. While no patterns were identified in the MCS analysis, OCS does not appear to function identically to MCS. Rather, four patterns were identified among the OCS graphemes:

Pattern 1: link, 3 cups, and a spine

Pattern 2: a bar atop stems

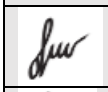
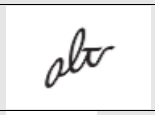
Pattern 3: a bar or wave between cups

Pattern 4: a spine with two loops.

The patterns were identified based on similar graphic features that aligned with the same phonetic values. I began by investigating the OCS graphemes without knowing their phonetic values, as to avoid unintentional bias. I then grouped any characters with shared graphic features, resulting in approximately 20 groups of graphemes. I proceeded to identify the phonetic values for each grapheme found in the 20 groups, and recorded overlap of graphic similarities and phonetic values of the graphemes. This process resulted in four groups, titled "pattern 1," pattern 2," "pattern 3," and "pattern 4."

Because the graphemes of these four groups shared graphic features and overlapped in phonetic values, they were identified as potentially significant patterns in OCS. All graphemes in pattern 1 contained the anatomical features of a link, 3 cups, and a spine. Graphemes found in pattern 2 contained the anatomical features of a bar atop one or more stems. Pattern 3 contained graphemes that included a bar or wave between two cups. And any graphemes that had a spine with two loops were placed in pattern 4.

Pattern 1 contained the fewest number of graphemes at 3 graphemes, pattern 2 contained 9 graphemes, pattern 3 contained 12 graphemes, and pattern 4 included the largest number of graphemes at 14 graphemes. Graphemes found in pattern 1 shared the phonetic value <e>, pattern 2 appeared with the value <o>, pattern 3 corresponded to the phonetic value of <a>, and pattern 4 contained a V grapheme. The four groups of patterns 1-4 are depicted below in Table 5;

P1grapheme	P1 value	P2grapheme	P2 value	P3 grapheme	P3 value	P4 grapheme	P4 value
	Ge		O		Nah		A
	He		Go		Dla		E
	te		Lo		Tla		O
			Mo		Tsa		U
			Tlo		Wa		Ha
			Me		Ya		La
			Nu		U		Na
			Di		Gi		Qui
			dv		Ho		Di
					Ne		Dla
					Nv		tlv
					que		We
							Wu
							yv

for each group, the left column contains the OCS grapheme, and the right column contains the phonetic value in standard Cherokee Romanized characters

Table 5. Graphemes of Significant Patterns Found in OCS.

Patterns 1-4 were all initially identified based only on graphic similarities, without consideration for their phonetic value to avoid skewing the results. Once the groups had been

identified, I then recorded their phonetic value next to their graphic form. After completing this process and examining the OCS graphemes independent of their ordering or phonetic value, I then examined the graphemes according to their phonetic values. Using Worcester's alphabetic arrangement, I looked for systematic graphic correspondence to consonantal or vocalic phonemes. This process did not illuminate any further shared graphic features beyond the original four groups identified.

Upon identification and isolation of the four patterns above, percentages were calculated to represent the amount of overlap between the graphic shape and the phonetic value of the groupings. Table 6 below summarizes the appearance rate of the graphic feature of interest and the identified significant phonetic value. Column 3 includes the percentage of graphemes that contain the anatomical feature out of the total number of graphemes in OCS, column 4 represents the percentage of graphemes containing the anatomical feature and significant phonetic value out of all graphemes that contain the anatomical feature, and column 5 contains the percentage for the number of graphemes with both the anatomical feature and the significant phonetic value out of all graphemes that contain the significant phonetic value.

Anatomy feature:	Identified associated phonetic value	(# of graphemes that contain the anatomical feature) / (total # of graphemes)	(# of graphemes w/ phonetic value & anatomy feature) / (# of graphemes that contain the anatomy feature)	(# of graphemes w/ phonetic value & anatomy feature) / (total # of graphemes w/ phonetic value)
Spine w/ 2 loops	V grapheme	(14/86) = 16%	(4/14) = 29%	(4/5) = 80%
Link, 3 cups, spine	e	(3/86) =3%	(3/3) = 100%	(3/14) = 21%
Bar atop stems	o	(9/86) = 16%	(5/9) = 56%	(5/13) = 38%
Bar/wave between cups	a	(12/86) = 14%	(6/12) = 50%	(6/18) = 33%

Table 6. OCS Anatomical Pattern Statistics.

When examining the anatomical feature of pattern 1, Table 6 below explains that only 3 graphemes out of all 86 OCS graphemes contain a link, 3 cups, and a spine. Of all characters that contain this anatomical feature, all 3 of them also share the phonetic value of interest <e>. Finally, of all graphemes that contain the phonetic value of <e>, only 3 characters contain a link, 3 cups, and a spine. If a pattern exists between graphic form and phonetic value, one would expect to see a low value for column 3, and high values for columns 4 and 5.

While there is patterning of graphic similarities and phonetic values, they vary in the percentage of overlap. This type of analysis is unprecedented in the literature, and as such, there is little way to know how statistically significant these values are. In other words, while the percentages are beneficial in understanding the distribution of the graphic similarities and the shared phonetic values of the four groups, statistical significance cannot be calculated without similar analyses conducted on other known syllabaries and abugidas. Even without statistical significance, the results of this analysis suggest that Sequoyah followed both a syllabic and abugida principles of writing systems.

3.3.2. Conclusions

As discussed in Chapter 2, a syllabary is a writing system in which graphemes represent individual syllables of the language, and contain no graphic similarities based on phonetic values. While the CS is commonly referred to as a syllabary, OCS appears to have graphic similarities based on shared phonetic values. These four patterns suggest that OCS may not be purely syllabic in nature, but rather may have been a mixed writing system originally, with secondary notations used to represent phonetic information about the characters. It is important to note that OCS appears to have four vowel diacritics represented in the graphemes, but MCS does not share this feature; this means that OCS and MCS are not identical writing systems.

Because no other analyses utilizing anatomical features and percentages of representation exist for other syllabaries, it is not currently possible to determine to what extent these statistics are representative of syllabaries. In Areas for Further Research, I will recommend further areas of research to confirm these claims with statistical significance.

3.4. SEQUOYAN ORDERING

I initially analyzed OCS and MCS characters in sections 3.3 and 3.4 independent of any ordering. This was done to avoid bias, and to confirm that any graphic patterns identified were not influenced by the order they appeared in, whether that be Sequoya's ordering or Worcester's ordering. Once the graphic forms for both OCS and MCS had been analyzed and any graphic similarities identified, I examined OCS and MCS characters in Worcester's systematic arrangement; however, no new graphic patterns were identified in the alphabetic arrangement.

While little is known about the Sequoyan ordering, I believe it is important to analyze both the Worcester arrangement and the Sequoyan order to conduct a holistic linguistic analysis

of the Cherokee writing system. Because of this, I analyzed the Cherokee writing system a third time, looking for graphic or phonetic patternings of the OCS graphemes that may not have been visible when analyzed independently or through an alphabetic arrangement.

3.4.1. Phonetic Values in the Sequoyan Order

I began by examining the phonetic values of the Sequoyan order to see if there was a particular pattern or grapheme ordering that stemmed from phonetic values of the syllables themselves. The rows and columns were labeled for easier identification, as seen below in Table 7.

C1	**C2**	**C3**	**C4**	**C5**	**C6**	**C7**	**C8**	**C9**	**C10**	**C11**	**C12**	**C13**	**C14**	**C15**	**C16**	
e	A	La	Tsi	Nah	Wu	We	Li	Ne	Mo	Gi	Yi	Si	Tlv	O	Lu	**R1**
Le	Ha	Wo	Tlo	Ta	Yv	Lv	Hi	S	Yo	Mv	Hu	Go	Tsu	Mu	Se	**R2**
So	Tli	Qui	Que	Sa	Qua	no	Ka	Tsv	Sv	Ni	Ga	Do	Ge	Da	-	**R3**
Gv	Wi	I	U	Ye	Hv	Dv	Gu	Tso	Quo	Nu	Na	Lo	Yu	Tse	-	**R4**
Di	Wv	Du	De	Tsa	V	nv	Te	Ma	Su	Tlu	He	Ho	Mi	-	-	**R5**
Tla	Ya	Wa	Ti	Tle	Hna	Quu	Dla	Me	Quv	-	-	-	-	-	-	**R6**

Table 7. Phonetic Values of Sequoyan Order.

By analyzing the Sequoyan order according to the horizontal and vertical arrangement of the phonetic values, I grouped characters that shared consonantal or vocalic phonemes. There were some phonetic similarities in the columns; for example, consider the phonetic values for /a/. /a/ appears in general groupings, first in C2 appearing in three of the six syllables, and then again in C5 appearing in four of the 6 syllables. Similar groupings are present for the vowels <v> and <o>. However, these general groupings appear to be the extent of the phonetic significance in the Sequoyan arrangement. Because of this, I conclude that there is no significant phonetic arrangement in the Sequoyan ordering based on only consonantal or vocalic phonemic values.

3.4.2. Graphic Forms in the Sequoyan Order

While no patterns were found in the Sequoyan order based on their phonetic values, I examined the Sequoyan order in search of patterns based on graphic similarities as well. I used the 4 graphic patterns identified in section 3.3.1, looking for overlap between the Sequoyan layout and the graphic similarities of the four patterns. For all four patterns, there appeared to be no relationship between the Sequoyan arrangement and the graphic forms of the graphemes. Table 8 below depicts the Sequoyan arrangement with all graphemes containing pattern 1 highlighted. The layouts for patterns 3-4 in the Sequoyan order can be found in Appendix C, with similar findings.

e	A	La	Tsi	Nah	Wu	We	Li	Ne	Mo	Gi	Yi	Si	Tlv	O	Lu
Le	Ha	Wo	Tlo	Ta	Yv	Lv	Hi	S	Yo	Mv	Hu	Go	Tsu	Mu	Se
So	tli	Qui	Que	Sa	Qua	no	Ka	Tsv	Sv	Ni	Ga	Do	Ge	Da	-
Gv	Wi	I	U	Ye	Hv	Dv	Gu	Tso	Quo	Nu	Na	Lo	Yu	Tse	-
Di	Wv	Du	De	Tsa	V	nv	Te	Ma	Su	Tlu	He	Ho	Mi	-	-
Tla	Ya	Wa	Ti	Tle	Hna	Quu	Dla	Me	Quv	-	-	-	-	-	-

Table 8. Layout of Pattern 1 in Sequoyan Order.

3.5. TRANSITIONS IN CHEROKEE WRITING

As is made evident by the graphic form analyses of OCS and MCS, OCS appears to function as more than only a syllabary, due to the overlap of certain graphic forms and certain phonetic values. There were 4 patterns identified that utilize secondary notation to indicate phonetic value within the graphic forms of the OCS characters. However, the analysis of MCS found no such patterns; this means that OCS and MCS function slightly differently and are not identical systems. In this section of my paper, I investigate the relationship between MCS and

OCS, to test to what extent the systems are graphically related and what features of OCS are maintained in the transition of OCS to MCS.

3.5.1. Commonality of Anatomical Traits in OCS and MCS

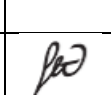
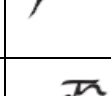
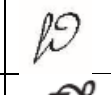
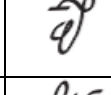
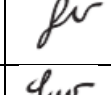
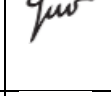
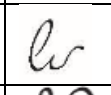
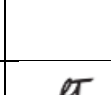
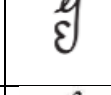
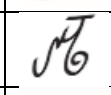
3.5.1.1. COMPARISON OF OCS AND MCS COMMONALITIES

To investigate the degree of relation between OCS and MCS, I first compared the graphic forms to see what anatomical features the OCS and MCS graphemes shared. I began by identifying both the OCS and MCS graphemes for one phonetic value, and recorded their anatomical forms; from there, I was able to calculate how many features, if any, were maintained from the OCS grapheme to the MCS grapheme. See Table 9 below, which contains the analysis and comparison of the anatomical features of OCS and MCS graphemes, including what features were maintained from OCS to MCS. In the final column, one of four options is included: N, ?N, ?Y, and Y. These are codes used to represent the number of features shared by the OCS and MCS characters. If the OCS and MCS grapheme have one or fewer graphic features in common, they are marked with an N. If the OCS and MCS graphemes have more than one thing in common, but do not look related, they receive a ?N. If the two graphemes share more than one anatomical feature and look related, they receive a ?Y. And finally, if the OCS and MCS graphemes share more than one graphic feature and are definitely related, they are marked with a Y. The four classifications and their criteria are summarized below:

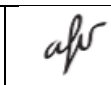
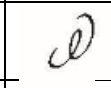
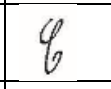
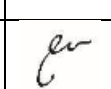
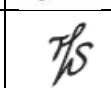
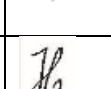
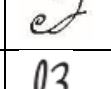
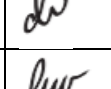
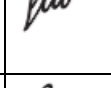
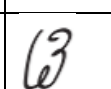
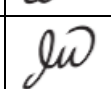
N: one or fewer anatomical features in common
?N: more than one anatomical feature in common, but appear unrelated
?Y: more than one anatomical feature in common, but appear related
Y: definite relation; deletion or substitution has taken place

These codes do leave slight ambiguities as to whether ?N or ?Y is selected, however, I believe it is important to have a set of criteria used to evaluate the similarities between the graphemes. To qualify as Y, meaning the OCS and MCS graphemes are definitely related, the process of deletion or substitution must have taken place; this can be seen in Table 9 below for the grapheme of the value <o>. When deciding whether two characters should receive a ?N or ?Y, I examined the characters to see if the same anatomical features were present and reorganized or rearranged between the OCS and MCS characters. If I could not envision a plausible rearrangement of the anatomical features of the graphemes, they were marked ?N. If a plausible rearrangement was visible between the OCS and MCS graphemes, they were categorized as ?Y.

Phonetic Value	**OCS**	**Anatomy**	**MCS**	**Anatomy**	**Maintained in transition?**	**Relation**
A		2 Cups, 3 loops, 2 spines, link	D	Bowl, stem	-	N
E		4 loops, 1 cups, 2 spines, 3 links	R	Bowl, leg, stem	-	N
I		2 loops, 1 spine, 1 link, 1 cup	T	Stem, bar	-	N
O		2 spines, 2 cup, 2 loops, 2 stems, bar	ಕ	Loop, link, bar, stem, cup	Stem, cup, loop, link	Y
U		2 loops, 2 stems, 1 spine, 1 cup, bar	ಲ	Loop, link, cup	Loop, cup	?Y
V		Bar, loop, stem, cup, 2 links	i	Stem, title	Stem	N
Ga		1 loop, 2 bowls, 1 cup, 2 spines	S	Spine, 2 cups, bar	Spine, cup	?N

ka		2 loops, 1 cup, 1 link	Ꭰ	Loop, cup	Loop, cup	Y
Ge		2 loops, 2 spines, 2 links, 3 cups, stem	Ꮉ	Spine, stem	Spine, stem	?Y
Gi		3 stems, 2 loops, 1 link, 1 cup, bar	Ꭹ	Cup, 2 stems	Cup, 2 stems	?N
Go		Bar, 2 stems, 2 spines, 2 cups	A	2 stems, bar	Bar, 2 stems	?N
Gu		stem, loop, link, cup	J	Bar, cup, stem	Cup, stem	?N
Gv		Bar, spine, 2 loops, 3 cups	E	3 bars, stem	Bar	N
Ha		2 spines, 1 link, 2 loops	Ꮒ	Loop, bar, link, stem	Loop, link	?N
He		1 loop, spine, link, stem, 4 cups	Ᏼ	Stem, cup	Stem, cup	?N
Hi		3 cups, 1 spine, stem	Ꮘ	2 cups, bar, cup	3 cups	?N
Ho		2 loops, 2 cups, 1 spine, 2 stems, 1 link, bar	Ꮒ	Stem, bar	Stem, bar	?Y
Hu		1 loop, bar, 2 stems, ear, 2 cups	Ꮗ	Stem, bar	Stem, bar	?Y
Hv		2 loops, 1 spine, 2 links, 1 cup	Ꮾ	Cup, loop, bar, link	Cup, loop, link	?Y
La		3 loops, 2 spines, link	W	4 stems	-	N
Le		Bar, 2 cups, spine, stem	Ꮄ	Loop, Cup	Cup	N
Li		2 spines, cup, stem, bar	Ꮁ	Stem, cup	Stem, cup	?Y
Lo		Bar, 2 stems, spine, cup	Ꮆ	Cup, stem	Cup stem	Y
Lu		Stem, link, spine, cup, loop	M	4 stems	Stem	N

Lv		2 loops, 1 cups, 2 links, stem	ꓷ	Spine, stem, cup	Stem, cup	?N
Ma		2 stems, 2 spines	ꓬ	Loop, ear, spine, 2 stems, bar	Spine, 2 stems	?Y
Me		Loop, 3 stems, link, bar, cup	ꓵ	Loop, link, stem	Loop, link, stem	?Y
Mi		Bar, loop, spine, cup, link	ꓧ	Bar, 2 stems	Bar	N
Mo		Loop, 2 cups, 2 stems, bar	ꓫ	Bar, stem, cup, ear	Bar, stem, cup	Y
Mu		Bar, 2 stems, loop, link, 2 cups, spine	ꓳ	Bar, cup, 2 stems	Bar, cup, stem	?N
mv		Spine, loop, link, bar	-	-	-	-
Na		Bar, 2 loops, spine, 2 cups	ꓟ	Loop, bar	Loop, bar	Y
Hna		2 stems, bar, cup	ꓶ	Bar, 2 stems, cup	Bar, 2 stems, cup	Y
Nah		Loop, 2 stems, 2 bars, 1 cup, spine	ꓖ	Bar, cup	Bar, cup	?Y
Ne		Loop, 2 stems, cup bar	ꓠ	2 cups, stem	Cup, stem	?N
Ni		3 cups, link, stem	ꓣ	Stem, shoulder	Stem	N
No		Loop, link, spine	ꓩ	2 bars, stem	-	N
Nu		Spine, 3 stems, loop, cup, bar link	ꓮ	2 bars, stem, 2 cups	Stem, cup	?N
Nv		bar, cup, spine, loop, 2 stems, spine, link	ꓯ	Spine, loop	Spine, loop	?Y
Qua		2 stems, link, loop, cup	ꓪ	2 bars, stem	Stem	N
Que		Bar, 2 stems, 2 cups	ꓤ	2 cups	2 cups	Y
Qui		3 loops, link, cup, spine	ꓰ	Loop, bowl, cup	Loop, cup	?Y

Quo		2 cups, link, spine, stem, loop	ᗯ	Cup, spine, 2 stems	Cup, spine, stem	?Y
Quu		Loop, 2 cups	ᘐ	2 cups	2 cups	Y
Quv		2 bars, stem, loop	ᘓ	2 cups	-	N
S		Stem, cup	ᘜ	Loop, link, cup	Cup	N
Sa		2 cups, bar, stem, cup	ᘻ	Cup, bar	Cup, bar	?Y
Se		Stem, loop, cup	ᘽ	Bar, arm, stem	Stem	N
Si		Loop, 2 cups, stem	ᘾ	Stem, bowl	Stem	N
So		Loop, 2 links, stem, spine, bar	ᙀ	Stem, spine	Stem, spine	?Y
Su		2 spines, loop, link, cup	ᙁ	Loop, 2 spines, cup	Loop, 2 spines, cup	Y
Sv		Bar, 2 stems, 2 links, spine, loop	ᙆ	Cup, leg, stem	Stem	N
Da		2 loops, bar, 2 stems, spine, cup	ᙎ	Stem, cup, bar	Stem, cup, bar	?Y
Ta		2 cups, stem, spine	ᙡ	4 stems	-	N
De		3 cups, link, loop	ᙢ	2 bars, spine, 2 cups	2 cups	?N
Te		Loop, stem, link, 3 cups, bar	ᙣ	Bar, stem, cup	Bar, stem, cup	?N
Di		2 loops, link, bar, 2 stems, cup	ᙤ	Stem, leg, cup	Cup, stem	?Y
Ti		Loop, stem, 2 links, 2 cups	ᙥ	Bar, stem, leg, cup	Stem, cup	?N
Do		Loop, 3 cups, link	ᙦ	2 stems	-	N
Du		2 loops, bar, link, 2 cups	ᙧ	Spine, 2 cups	2 cups	?N

Dv		Loop, link, 2 stems, 2 cups, bar	ᏽ	Loop, link, cup	Loop, link, cup	?Y
Dla		2 stems, cup, link, 2 loops, spine	ᏸ	3 loops, link, 2 spines	2 loops, link, spine	?N
Tla		Stem, loop, link, spine, cup, 2 stems, link, cup, bar	Ꮭ	Stem, bar, cup	Stem, cup, bar	?N
tle		2 stems, loop, link, 2 cups	Ꮮ	Bar, stem	Stem	N
tli		Bar, 2 stems, link, loop, cup	Ꮯ	Cup	Cup	?Y
tlo		Cup, 2 stems, bar, spine	Ꮹ	Loop, bowl, stem	Stem	N
tlu		2 loops, 2 links, stem	Ꮿ	Bar, link, cup, loop	Loop, link	?Y
tlv		3 loops, spine, 2 cups, link	Ᏸ	Bowl, stem	-	N
Tsa		2 loops, link, 2 stems, spine, bar	Ꮳ	Bar, cup	Bar	N
Tse		3 loops, 2 cups, link, 2 spines	Ꮷ	2 stems, bar	-	N
Tsi		2 stems, spine, bar, 2 cups	Ꮸ	2 stems, shoulder, ear	Stem	N
Tso		3 stems, 2 cups	Ꮶ	Stem, arm, leg	Stem	N
Tsu		Link, 2 stems, cup, 2 bars, loop	ᏻ	Loop, stem	Stem	N
Tsv		2 cups, stem, loop, link	Ꮼ	2 waves, cup	Cup	N
Wa		2 spines, 2 cups, loop, 2 stem bar, link	Ꮾ	Loop, bar, ear	Loop, bar	?Y
We		3 loops, 2 links, cup, spine	Ꮻ	2 loops, link, cup	2 loops, cup, link	Y
Wi		2 stems, 2 spines, loop, 2 cups, link	Ꮺ	Spine, loop	Spine, loop	?Y

Wo		2 loops, link, cup	ᦲ	Loop, cup	Loop, cup	?Y
Wu		Spine, 2 loops, 2 cups	ᦳ	Loop, cup	Loop, cup	?Y
Wv		2 spines, cup, stem, loop	ᦶ	Loop, cup	Loop, cup	?N
Ya		Loop, link, cup, 3 stems, wave, 2 cups	ᦷ	2 cups, wave	2 cups, wave	Y
Ye		2 bowls, loop, 2 cups	ᦸ	2 bowls, stem	2 bowls, stem	Y
Yi		Loop, link, spine, cup	ᦹ	Link, bar, cup, arm	Link, cup	?N
Yo		3 cups, link, spine, loop	ᦺ	Cup, shoulder, stem	Cup	N
Yu		2 loops, 2 spines, 2 stems, 2 cups	ᦻ	Bar, cup, stem, wave	Cup, stem, wave	?N
Yv		3 loops, 2 spines, link, cup	ᦼ	Stem, 2 bowls	-	N

Table 9. Comparison of OCS and MCS Graphemes.

Of the 85 OCS and MCS graphemes, 35% have one or no anatomical features in common and therefore are not (obviously) related, while 27% are definitely related as only deletion of part of the grapheme has occurred between OCS and MCS. Furthermore, 24% are likely not related (?N) with more than one feature in common but no obvious way to arrive at the MCS form through modification of the OCS form, while 14% may be related (?Y) as they share more than one anatomical feature and an argument can be made for arriving at the MCS form through modifications of the OCS form. Table 10 below demonstrates how ?N and ?Y categorization took place. The commonality code of the phonetic value [du] in the second row is demarcated as ?N, because while the OCS and MCS graphemes share more than one anatomical feature (2 cups), these shared anatomical features cannot be easily arranged from the OCS grapheme to

result in the MCS grapheme. In the fifth row for the phonetic value [sa], the relation is marked as ?Y because there is more than one formal feature shared (a cup and a bar) that can be rearranged from the OCS grapheme to result in the MCS grapheme.

Phonetic Value	OCS	Anatomy	MCS	Anatomy	Maintained in transition?	Relation
Du		2 loops, bar, link, 2 cups	ᔑ	Spine, 2 cups	2 cups	?N
Ha		2 spines, 1 link, 2 loops	ᐣ	Loop, bar, link, stem	Loop, link	?N
Tlu		2 loops, 2 links, stem	ᘐ	Bar, link, cup, loop	Loop, link	?Y
Sa		2 cups, bar, stem, cup	ᕀ	Cup, bar	Cup, bar	?Y

Table 10. Distinguishing traits of ?Y and ?N.

This creates a 59% to 41% split; 59% of OCS and MCS graphemes are definitely not or probably not related, while 41% are definitely or are likely related. This suggests that OCS and MCS are related to some extent, with at least 41% of the characters being related. According to my comparative analysis, OCS and MCS are not arbitrary unrelated systems but rather share some level of correspondence. The commonality values are recorded below in Table 11.

Relation Value	(# of relation value) / (total # of graphemes)	Percentage
N	30/85	35%
?N	20/85	24%
?Y	12/85	14%
Y	23/85	27%

Table 11. OCS & MCS Comparison Statistics.

3.5.1.2. COMMONALITIES ACCORDING TO CUSHMAN (2010)

Cushman (2010) conducted a similar study analyzing the amount of correspondence between OCS and MCS counterparts of one phonetic value in Cherokee. Characters were grouped based on "visible levels of correspondence," and 4 levels of correspondence were used: 1) no correspondence, 2) little correspondence, 3) some correspondence, and 4) direct correspondence. The criteria or graphic qualities that classified graphemes as having no correspondence, little correspondence, some correspondence, and direct correspondence are not defined.

Cushman states that characters with no correspondence "show…alphabetic characters were borrowed", characters with little correspondence "show deeply revised characters for print," and characters with some correspondence have "one or two transformations of visible elements" (630). The exact application of correspondence was not defined. Figure 15 below shows the entirety of Cushman's correspondence analysis; she provides evidence of four graphemes, however, the analysis of the remaining characters is not included.

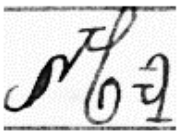
Level of correspondence	Number of characters	Sample character in script and print	Analysis
Direct	21		The top right flourish was retained to create the final print character for Ꭰ */ka/* to the left. Other characters in this category retained key elements of the original to create the print.
Some	23		Here in the character for Ꮟ */si/*, the flourishes were reduced and substituted with line serifs with circular sweeps made into half circles. In this category, the transformations of the script characters might have included a selection and amplification of elements (e.g., Ꮳ */ga/* selects the top and bottom ornamentations and adds a horizontal line to replace the middle filigree), or an inversion of the script (as Ꮞ *se* has flipped horizontally), or lines that were once curved were straightened (e.g., Ꮁ */hu/*, Ꮵ */qua/*, and Ꮓ */no/*).
Little	23		The script for Ꭿ */nu/* seems to retain an element from the middle of the first upstroke that is a circle that nearly closes upon itself. The transformations of the script characters in this category may have little correspondence with the original script and instead create new shapes altogether.
None	16		The print version for M */lu/* has no correspondence to its original script. All in this category seem to have been borrowed from the Roman alphabet.

Figure 15. Cushman (2010) Graphic Analysis. Description. Adapted from Cherokee Syllabary from Script to Print. (pg 632) by Cushman, Ellen (2010). Ethnohistory 57(4), pp. 625-649.

At times, Cushman appears to reference anatomical features, as I have done in my analysis; for example, when considering the OCS and MCS graphemes representing the syllables <ka>, Cushman states “the top right flourish was retained.” At other times, however, Cushman

seems to examine the overall shape of the characters rather than the anatomical form; one such example is the OCS and MCS graphemes for the value <si>.

Cushman finds that 67 out of 86 characters showed some level of correspondence, approximately 78%. These findings are distinct from my own observations, as I found 41% of characters to show definite or possible correspondence, almost half of Cushman's findings. This means that only 22% of characters in Cushman's analysis had no level of correspondence, while I found that 61% likely did not or definitely had no correspondence. Cushman goes on to say that if characters in the CS display no correspondence, these characters "seem to have been borrowed from the Roman alphabet" (632).

Cushman and I had drastically different levels of correspondence between OCS and MCS characters, so I took it upon myself to further investigate her claim of grapheme borrowing when no correspondence was found. Again, we had very different results. While Cushman claims that characters with no correspondence appear to have been borrowed from the roman alphabet, suggesting a 100% borrowing rate, I found that only 63% of my characters that were found to have no correspondence borrowed Roman alphabet letters, and 36% were entirely new characters. I determined whether graphemes with no correspondence were borrowed from the Roman Alphabet based on if the MCS graphemes had a direct graphemic counterpart in the Roman Alphabet. As to not drastically skew the data, I only included characters deemed to share one or no anatomical features, which was only 35% of all 85 CS characters. These statistical results can be seen summarized below in Table 12, and the 19 graphemes with no correspondence and borrowed characters can be seen in Table 13.

Borrowed from Roman Alphabet	%	NOT borrowed from Roman Alphabet	%
19/30	63%	11/30	36%

Table 12. Percentage of Borrowed Characters.

Phonetic Value	OCS	MCS	Seem related?
A		D	N
E		R	N
I		T	N
V		i	N
Gv		E	N
La		W	N
Lu		M	N
Mi		H	N
Ni		h	N
No		Z	N
Qua		I	N
Si		b	N
Sv		R	N
Ta		W	N
Do		V	N
tle		L	N
tlv		P	N

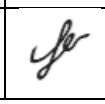
Tso		K	N
Yv		B	N

Table 13. Borrowed OCS graphemes with no correspondence to MCS graphemes.

3.5.1.3. CONCLUSIONS

While the results of Cushman's (2010) and my own study are strikingly different, in both studies correspondence was found between OCS and MCS graphemes of the CS. This supports the claim that OCS and MCS are not entirely separate, independent systems, but rather that MCS was developed from OCS. Yet, levels of correspondence are not the only evidence of the relationship between MCS and OCS; in addition to correspondence, I accumulated and investigated primary documents containing OCS and MCS graphemes to track the evolution of the characters themselves.

3.5.2. Evolution of Cherokee Graphemes

3.5.2.1. GRAPHEME VARIATIONS FOUND IN ACCOUNT B

As further evidence of the relationship between OCS and MCS, I examined the CS characters within different primary documents to see if there is a traceable evolution of the characters over time. If OCS and MCS are related, there likely was a transition period in which the MCS characters were being developed and standardized from the OCS characters. While most primary documents were either written wholly in OCS or MCS, there was one document in particular which had nine graphemes that did not look like the OCS or the MCS graphemes. Frozen in time, we have a primary document from 1839 that shows the CS graphemes

transitioning from OCS to MCS. I refer to this primary document as “account b”; Account b is discussed in Sarbaugh & Walker (1993) as being a part of the Thomas Gilcrease Museum in Tulsa. The Gilcrease Manuscripts include four documents attributed to Sequoyah, including Account b. Account b is seen below in Figure 16, signed by Sequoyah and dated to 1839.

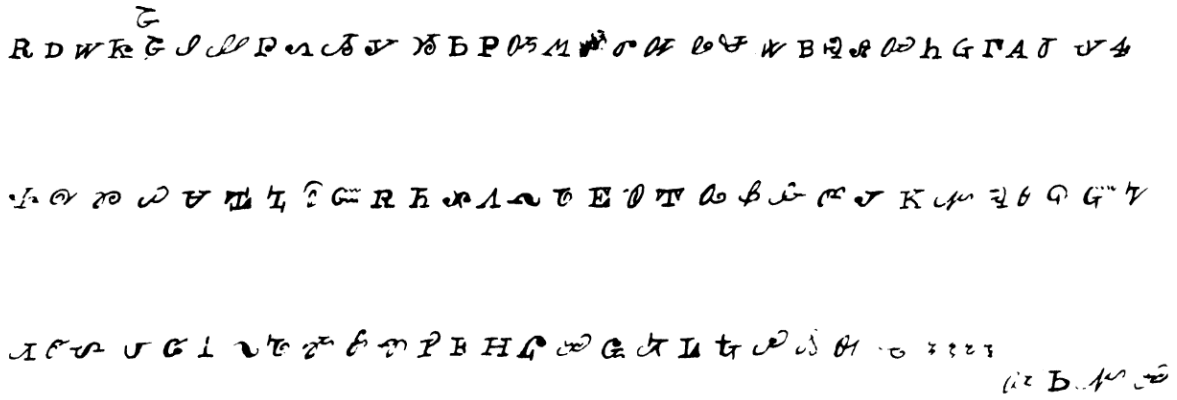


Figure 4. The John Howard Payne syllabary of 1839, signed by Sequoyah. Detail from catalogue no. 4026.312 from the collection of the Gilcrease Museum, Tulsa, OK.

Figure 16. MCS Characters in Sequoyan Order. Adapted from “The Early History of the CS,” (pg. 78) by W. Walker & J. Sarbaugh, 1993, Ethnohistory, 401(1).

Sarbaugh & Walker (1993) acknowledge that a number of characters differ from both OCS and MCS characters, stating “there are 6 characters…that differ substantially from the modern standard: no. 34 [tli], no. 46 [ge], no. 60 [lo], no. 65 [du], no. 66 [de], no. 69 [nu].” However, this is all that is said; they do not discuss how the characters differ, or the significance of the graphemic variation. Within Account b, I found nine characters that differed from both their OCS and MCS characters: [mo], [mv], [tli], [do], [ge], [nv], [du], [de], and [lo]. The OCS, MCS and account b characters for these 9 graphemes can be seen below in Table 14. Through these nine characters, it is evident that MCS characters developed directly from their OCS counterparts, meaning that OCS and MCS are related to some extent.

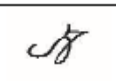
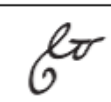
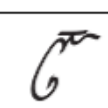
Phonetic Value	OCS	Acct b (1839)	MCS
Mo			Ꭿ
Mv			-
Tli			C
Do			V
Ge			Ꮀ
Nv			Ꮎ
Du			S
De			Ꮥ
Io			Ꮆ

Table 14. Evolution of nine Cherokee Graphemes Found in Account b.

While Sarbaugh & Walker (1993) do not investigate the variation in the graphic form of these nine graphemes, Cushman (2010) discusses the development of 2 of the characters: <du, do>. According to Cushman, these three characters were decisively transformed into their MCS graphemes through the necessity of finding typesetters during the era of print newspapers. Thomas (2008) explains that Worcester flipped the grapheme for <do>, <V>, intentionally when requesting typesetters to print the Cherokee language. The original MCS grapheme was oriented upside down, in the shape of a pyramid. The orientation of the character was altered because of the access to a <V> typeset. Similarly to <do>, <du> followed a parallel process; <du> was

originally an elongated, horizontal “s”-like shape, that was reoriented into a vertical <S> as this typeset already existed for the English alphabet.

Thomas (2008) and Cushman (2010) provide plausible explanations for these “in-between” graphemes seen above in Table 14 for the phonetic values <du> and <do>, however no explanation is provided for the characters depicting the remaining seven characters. Sarbaugh & Walker (1993) examine a number of primary Cherokee documents, with the intent of illuminating Sequoyah as the creator of both OCS and MCS variations of the Cherokee writing system, despite most scholars’ claims that OCS was created by the Christian missionary Worcester rather than by Sequoyah himself. Their primary evidence is a letter that Sequoyah wrote in MCS graphemes before Worcester’s contact with the community.

Account b supports their claim that Sequoyah created both OCS and MCS graphemes, because Sequoyah’s signature is present on account b in which transitional graphemes are present. As such, I believe that these nine graphemes above support their claim, in that Sequoyah likely created OCS and adapted the CS graphemes into their MCS counterparts. The exact motivation for this transition is unknown, but is discussed in greater detail in section 3.5.4.

3.5.2.2. EVOLUTION OF [TLI]

While 9 graphemes are found to be unlike either their OCS or MCS counterparts in account b, the number of variant graphemes for the phonetic value [tli] are more numerous and extreme. In Table 15 below, 10 variations of the character [tli] are present from different primary documents. I identified ten different documents containing the [tli] Cherokee grapheme, and have included a description of all ten sources below.

C1: Column 1 contains an OCS grapheme that is apart of a chart titled “Sequoyah’s original syllabary chart.” This chart contains only OCS graphemes. The source and date of the graphemes of this chart are generally unknown. The chart can be viewed in Appendix C.

C2: Column 2 contains a grapheme found in a chart of only OCS graphemes. The exact source and date for this document is also unknown (Dennis, 2014). The entire document is visible in Figure 7 of this paper.

C3: Column 3 is a grapheme attributed to Worcester in an 1825 letter. This grapheme is neither the OCS or MCS grapheme. The full document can be seen in Appendix E (Worcester, 1825).

C4: The grapheme in column 4 is dated to 1826 and reproduced by Barbour (Barbour, 1826). The primary document can be seen in Appendix F.

C5: The grapheme of column 5 is attributed to Worcester. It is dated to 1828 and is found in the first volume of the Cherokee Phoenix (Worcester, 1828a). The document can be seen in Figure 9.

C6: Column 6 contains a grapheme dated to 1839 and is attributed to Sequoyah. The document includes both the OCS and MCS graphemes. This document is a part of the Gilcrease Museum in Tulsa, OK, and can be seen in Figure 6.

C7: the grapheme in column 7 is signed by Sequoyah and dated to 1839. Within this document, only the MCS graphemes are recorded (Sarbaugh & Walker, 1993). The entire document can be viewed in Figure 8.

C8: Column 8 is dated to 1947 and only includes MCS characters. The author is unknown (Sarbaugh & Walker, 1993). This document can be seen in Appendix G.

C9: The grapheme in column 9 is from the Cherokee new testament, however the author is unknown; this copy of the new testament is dated to 1961 (Anonymous, 1961). This primary document can be seen in Appendix H.

C10: The final grapheme is the MCS grapheme used today. This particular font is the "Digohweli" typeface of the symbols feature in Microsoft Word.

The table below depicts the transition from the OCS grapheme of [tli] to the MCS grapheme. The characters begin with OCS characters, and then developed into having both OCS characters and the transitional grapheme present, then only the transitional grapheme is present, finally resulting in the MCS grapheme. Through the evolution of the grapheme [tli], we can see a development of the grapheme from the OCS character to the MCS character with a transition period displaying the changes. By examining the evolution of these 10 graphemes, we are able to support Sarbaugh & Walker (1993)'s claim that MCS was created by Sequoyah, rather than Worcester, and that OCS and MCS are related writing systems.

Column	**C1**	**C2**	**C3**	**C4**	**C5**	**C6**	**C7**	**C8**	**C9**	**C10**
Date/ Title	OCS	Acct c (unknown)	1825	1826a	1828a	Acct a (1839)	Acct b (1839)	1947	1961	MCS
Grapheme										C

Table 15. Evolution of [tli].

3.5.2.3. CONCLUSIONS

By examining the anatomical features that OCS and MCS share, and tracking the evolutionary developments in OCS and MCS graphemes, it is evident that OCS and MCS are related systems used to represent the CS, rather than wholly independent, arbitrary systems. If OCS and MCS are related systems, it stands to reason that any significant secondary notions conceived in OCS could have been intentionally maintained into MCS.

3.5.3. OCS Patterns Maintained in MCS

To investigate the level of anatomical feature maintenance from OCS to MCS graphemes, I began by comparing the OCS and MCS graphemes identified as significant for the four patterns in section 3.3.1. I isolated the OCS and MCS forms of the graphemes in the four patterns that contained the proposed significant phonetic value. From there, I was able to directly see if the anatomical forms that created the graphic pattern were maintained from OCS to MCS. The diacritic was considered to have been maintained if the anatomical features were present in the MCS grapheme; I allowed for the anatomical pieces to be reoriented and rearranged within the character.

Of the four patterns examined, two appear to maintain the secondary vowel notation from OCS to MCS: pattern 2 and pattern 3. The OCS and MCS graphemes for pattern 2, a bar atop 2 stems, can be seen in Table 16 below. Of the five characters containing the pattern 2 anatomical feature and the phonetic value /o/, four of those five (4/5) graphemes maintain the vowel diacritic from the MCS character to the OCS grapheme. The only character that does not maintain the diacritic is for the phonetic value <lo>, seen below.

OCS Grapheme	MCS Grapheme	Phonetic Value
	ᏼ	O
	A	Go
	Ꮆ	Lo
	Ꮟ	Mo
	Ꮾ	tlo

Table 16. Pattern 2 Maintained in MCS.

OCS Grapheme	MCS Grapheme	Phonetic Value
	Ꮆ	Nah
	Ꮮ	Tla
	Ꮶ	Wa
	Ꮻ	Ya
	Ꮯ	Tsa
	Ꮄ	dla

Table 17. Pattern 3 Maintained in MCS.

Graphemes containing pattern 3 also appear to maintain the graphic similarity from the OCS grapheme to the MCS grapheme. Above in Table 17, the six graphemes that contain the anatomical feature of a bar or wave between 2 cups and share the phonetic value /a/ are depicted. Of these 6 graphemes, 5 of these graphemes maintain the anatomical feature (5/6). The only grapheme that does not maintain the bar between cups from the OCS grapheme to the MCS grapheme is for the value <dla>. These shared anatomical features were not recognized when MCS graphemes were independently analyzed for graphic similarities early in the analysis, and are not explicitly clear unless related to their OCS counterparts. Pattern 1, a link, 3 cups, and a spine, and pattern 4, a spine with 2 loops, were not maintained into MCS. It is important to note that only the graphemes that contain the phonetic value of interest were examined to identify if the diacritic was maintained into the MCS grapheme.

Of the four graphic patterns of significance, two maintain the vowel diacritics from OCS to MCS. As such, OCS characters share more graphic similarities between themselves when compared to MCS characters; OCS had four graphic patterns that graphemes shared, while MCS only has two shared graphic patterns. This change in amount of graphic similarity between graphemes of OCS and MCS show the developmental pattern of divergence. As discussed in section 2.2.2, divergence is a process of writing system development in which characters become more distinct in form over time. Because CS graphemes have more shared features in OCS, and less graphic similarities in MCS, the graphemes are becoming more distinct from one another, diverging in appearance as the graphemes develop.

3.5.4. Patterns in Cherokee Writing Transitions

It is clear that the OCS and MCS are not identical, in terms of the writing system they function as and in appearance. A shift took place in which OCS was phased out for MCS; when and why this happened remains unknown. We do not know how soon after the OCS' creation the MCS was invented and implemented. Many scholars presume that OCS and MCS are unrelated in their graphic forms; however, we have seen this is not true. Rather, OCS and MCS share extensive overlap and commonalities in their graphic shape.

3.5.4.1. DIVERGENCE OF CHEROKEE GRAPHEMES

Through the evolution of CS graphemes from OCS to MCS graphemes, three main graphic changes take place creating the graphemes in use today: rotation, deletion, and substitution. These three processes of graphic development result in the divergence of CS graphemes, as they become more distinct from OCS to MCS graphemes. Table 18 below depicts 18 graphemes that underwent the process of graphic deletion, the most prolific process of

graphic change, resulting in the deletion of one or more anatomical elements of OCS graphemes creating MCS graphemes. Table 19 lists all three graphemes that underwent the graphic process of substitution, in which anatomical features are replaced with a new anatomical piece. Finally, Table 20 displays four CS graphemes that were rotated from OCS to MCS; it is important to note that this table considers the liminal graphemes discussed in section 3.5.2.1.

Phonetic Value	**OCS Grapheme**	**MCS Grapheme**
O		ѻ
U		ᴏ̑
Ka		ᘐ
Ge		Ⱨ
Hu		Γ
Mo		ȝ
Na		ϴ
Hna		҂
Nah		G

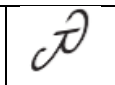
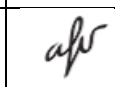
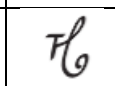
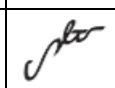
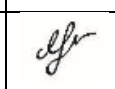
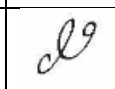
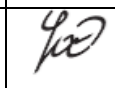
Que		ᘐ
Quo		ᘳ
Tli		C
Wa		Ꮆ
We		ᙇ
Wo		ᙆ
Wu		ᘇ
Ya		ᘓ
Ye		ᗷ

Table 18. Deletion in Cherokee Graphemes.

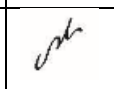
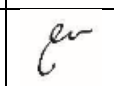
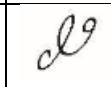
Phonetic Value	**OCS Grapheme**	**MCS Grapheme**
Ma		ᘐ
Su		ᘕ
Wo		ᙆ

Table 19. Substitution in Cherokee Graphemes.

Phonetic Value	OCS Grapheme	Liminal Grapheme	MCS Grapheme
Nah		n/a	G
Wa		n/a	Ꮆ
Do			V
Du			S

Table 20. Rotation of Cherokee Graphemes.

3.5.4.2. PATTERNS OF TRANSFORMATION

Cherokee writing has had a traceable and distinct transformation from OCS to MCS, however the process of adaptation and transformation extend beyond only writing in Cherokee history. Perdue & Green (1995) traces this unique aspect of Cherokee culture to the 19th century, as many Cherokee citizens agreed to adopt the US government's "civilization" program adapted the program to fit their community needs; the numerous Cherokee adjustments to the "civilization" program are discussed in detail in section 1.1.2. Frey (2013) discusses Cherokee organization amendment in depth, recognizing "the ways [that]…traditional strategies [were used] to negotiate the relationships between North Carolina Cherokees, the federal government, and other Appalachian communities" (70). Two excellent examples of Cherokee transformation can be seen in The Cherokee Boys Club and Qualla Arts & Crafts Mutual Inc, as both programs were organized through the US government but were adapted to work for the community and become Cherokee. Both organizations began with the input and contribution of the US

government but were amended to focus on important aspects of Cherokee culture such as community planning, autonomy, harmony, mutual dependency, and obligation (Frey, 2013).

This framework allows for a direct means to interpret the transition from OCS to MCS, as CS graphemes began to look more similar to the Roman alphabet. Just as the "civilization" program, the Cherokee Boys Club, and the Qualla Arts & Crafts Mutual Co-op incorporated Cherokee values into government programs, Cherokee writing adopted the Roman alphabet and amended the characters to uniquely represent the Cherokee language.

CONCLUSIONS

Cherokee writing is a new form of writing that came about in an extremely tumultuous cultural environment. It is the posterchild of syllabic writing systems, as the word syllabary is in the name of the Cherokee writing system. Few scholars have questioned the Cherokee Syllabary's position in modern times, accepting the creation tale and symbolic function as it has been told since the 19th century. Bender (2002) and Cushman (2010) acknowledge the complex and diverse history and uses of the CS, calling for further investigatory efforts. As such, I completed a linguistic analysis of the graphic forms of the CS in both OCS and MCS.

My analysis of the MCS supported the common dialogue surrounding the CS, as MCS functions as a syllabary with no overlap between graphic shape and phonetic value. However, OCS did have graphic similarities between shared phonetic values, illuminating four patterns based on anatomical features that weren't present in MCS: pattern 1, pattern 2, pattern 3, and pattern 4. More work must be done to conduct statistical analyses to confirm the statistical significance of these patternings, as these graphic similarities have not previously been discovered in OCS. The graphic similarities suggest that OCS originally functioned as a mixed

writing system, utilizing both syllabic features, as graphemes correspond to individual syllables, and abugida features, as secondary vowel notations are observed.

By analyzing the graphic form of both OCS and MCS, I was able to complete a comprehensive comparative analysis of OCS and MCS graphemes. This comparative analysis revealed that OCS and MCS graphemes are related to some extent, and are not completely unique, unrelated systems. Rather, MCS graphemes likely developed from their OCS counterparts. As further evidence of the relationship between OCS and MCS graphemes, the evolutionary steps of 9 graphemes were discussed: [mo], [mv], [tli], [do], [ge], [nv], [du], [de], and [lo]. This level of correlation between OCS and MCS graphemes supports Sarbaugh & Walker's (1993) claim that Sequoyah created OCS and then revised to the MCS system without the input of the Christian missionary Worcester. As OCS and MCS are related, it opened the possibility for OCS vowel diacritics to be maintained in the MCS graphemes; the anatomical features of pattern 2 and pattern 3 were discovered to have been maintained in MCS graphemes.

While the timeframe and Sequoyah's motivation for transitioning from OCS graphemes to MCS graphemes has been lost, general reasons have been suggested. Ideas on the transition from OCS to MCS include 1) that MCS functions as a shorthand and 2) that MCS was required to transition to print. However, I propose a third alternative inspired by Frey's (2013) dissertation: the CS followed a similar pattern of development to other Cherokee organizations, as programs introduced by the federal government were amended to reflect Cherokee cultural values. As such, MCS graphemes borrowed the shape of characters from the Roman alphabet but altered them to meet the needs of the Cherokee language. In many ways, the analyses conducted for this paper are preliminary and unsubstantiated, in that they are the first of their kind; as such, there is a plethora of opportunity to conduct further research to address new questions that arose

through the study and to search for statistical significance. My formal graphic analysis of OCS and MCS can now serve as foundational data for future paleographic investigation of Cherokee writing.

AREAS FOR FURTHER RESEARCH

There are two general areas of research that would be beneficial to confirm and further explore the Cherokee writing system. Firstly, the linguistic analysis that I have conducted on the CS has not been performed on other writing systems. Because of this, it is not possible to identify statistical significance in the percentages of section 3.5.1.1 with the current available information. To remedy this, I would like to perform an anatomical analysis on known syllabaries and abugidas to calculate the same percentages, to be able to identify statistical significance in the distribution of the four graphic patterns in OCS. Not only that, but I would like to compare the percentages in section 3.5.1.1 to statistically random variation. Statistical significance of the graphic patterns found in OCS will only be confirmed by comparing the percentages calculated from OCS to other known syllabaries, abugidas, and to random variation.

Secondly, Cushman (2010)'s comparative analysis results differ significantly from my own comparative analysis results, as she found that 78% of OCS and MCS graphemes were related while I only found 41% to be related. I believe this warrants further exploration, as her percentage is near double my own. My comparative analysis utilized the anatomical features of the graphemes themselves, and compared the number of shared anatomical features and the general amount of visible resemblance. A comparison of the general shape of the graphemes would also be beneficial to identify the amount of commonality between OCS and MCS graphemes. I believe the easiest way to investigate this is by breaking the OCS and MCS graphemes into quadrants and overlaying them graphically, to get a numerical representation of

general grapheme shape overlap. And finally, because Cushman and I had such drastically different results when conducting similar analyses, I would like to complete a judgement statistical test, in which other linguists reduplicate the study following my criteria to confirm the precision of the comparative analysis.

APPENDIX A: OCS, MCS, AND MODERN CHEROKEE FONT. Duncan, Barbara & Standingdeer, John. 2008. Key to: Sequoyah's original syllabary, script syllabary, print syllabary, English phonetics. Design by Joyce Cooper. Museum of the Cherokee Indian.

APPENDIX B: VARIOUS CHEROKEE ORTHOGRAPHIES. Herrick et al. (2015). Collaborative Documentation and Revitalization of Cherokee Tone. Language Documentation & Conservation 9, pp. 12-31. Page 17.

	Short vowel		Long vowel					
	Mid	High	Mid	High	Super-high	Low-fall	Falling	Rising
Cherokee Syllabary	Ꭳ	Ꭳ	Ꭳ	Ꭳ	Ꭳ	Ꭳ	Ꭳ	Ꭳ
Standard Romanization	o	o	o	o	o	o	o	o
Montgomery-Anderson	o	ó	oo	óo	óó	oò	óò	òó
UCLA Cherokee Papers	ò	ó	òò	óó	óo	òo	óò	òó
Pulte & Feeling	ọ^{2}	ọ^{3}	o^{2}	o^{3}	o^{4}	o^{1}	o^{32}	o^{23}
Scancarelli Dissertation	ò	ó	ò:	ó:	ő:	ȍ:	ô:	ǒ:
Cherokee Tone Project	ō	ó	ō:	ó:	ő:	ò:	ô:	ǒ:

TABLE 1. Differing Orthographic Systems of Cherokee

APPENDIX C: LAYOUT OF PATTERNS 1-4 IN THE SEQUOYAN ARRANGEMENT.

Pattern 1: Link, 3 cups, spine (e)

e	A	La	Tsi	Nah	Wu	We	Li	Ne	Mo	Gi	Yi	Si	Tlv	O	Lu
Le	Ha	Wo	Tlo	Ta	Yv	Lv	Hi	S	Yo	Mv	Hu	Go	Tsu	Mu	Se
So	tli	Qui	Que	Sa	Qua	no	Ka	Tsv	Sv	Ni	Ga	Do	Ge	Da	-
Gv	Wi	I	U	Ye	Hv	Dv	Gu	Tso	Quo	Nu	Na	Lo	Yu	Tse	-
Di	Wv	Du	De	Tsa	V	nv	Te	Ma	Su	Tlu	He	Ho	Mi	-	-
Tla	Ya	Wa	Ti	Tle	Hna	Quu	Dla	Me	Quv	-	-	-	-	-	-

Pattern 2: bar atop stems (o)

e	A	La	Tsi	Nah	Wu	We	Li	Ne	Mo	Gi	Yi	Si	Tlv	O	Lu
Le	Ha	Wo	Tlo	Ta	Yv	Lv	Hi	S	Yo	Mv	Hu	Go	Tsu	Mu	Se
So	tli	Qui	Que	Sa	Qua	no	Ka	Tsv	Sv	Ni	Ga	Do	Ge	Da	-
Gv	Wi	I	U	Ye	Hv	Dv	Gu	Tso	Quo	Nu	Na	Lo	Yu	Tse	-
Di	Wv	Du	De	Tsa	V	nv	Te	Ma	Su	Tlu	He	Ho	Mi	-	-
Tla	Ya	Wa	Ti	Tle	Hna	Quu	Dla	Me	Quv	-	-	-	-	-	-

Pattern 3: bar/wave between cups (a)

e	A	La	Tsi	Nah	Wu	We	Li	Ne	Mo	Gi	Yi	Si	Tlv	O	Lu
Le	Ha	Wo	Tlo	Ta	Yv	Lv	Hi	S	Yo	Mv	Hu	Go	Tsu	Mu	Se
So	tli	Qui	Que	Sa	Qua	no	Ka	Tsv	Sv	Ni	Ga	Do	Ge	Da	-
Gv	Wi	I	U	Ye	Hv	Dv	Gu	Tso	Quo	Nu	Na	Lo	Yu	Tse	-
Di	Wv	Du	De	Tsa	V	nv	Te	Ma	Su	Tlu	He	Ho	Mi	-	-
Tla	Ya	Wa	Ti	Tle	Hna	Quu	Dla	Me	Quv	-	-	-	-	-	-

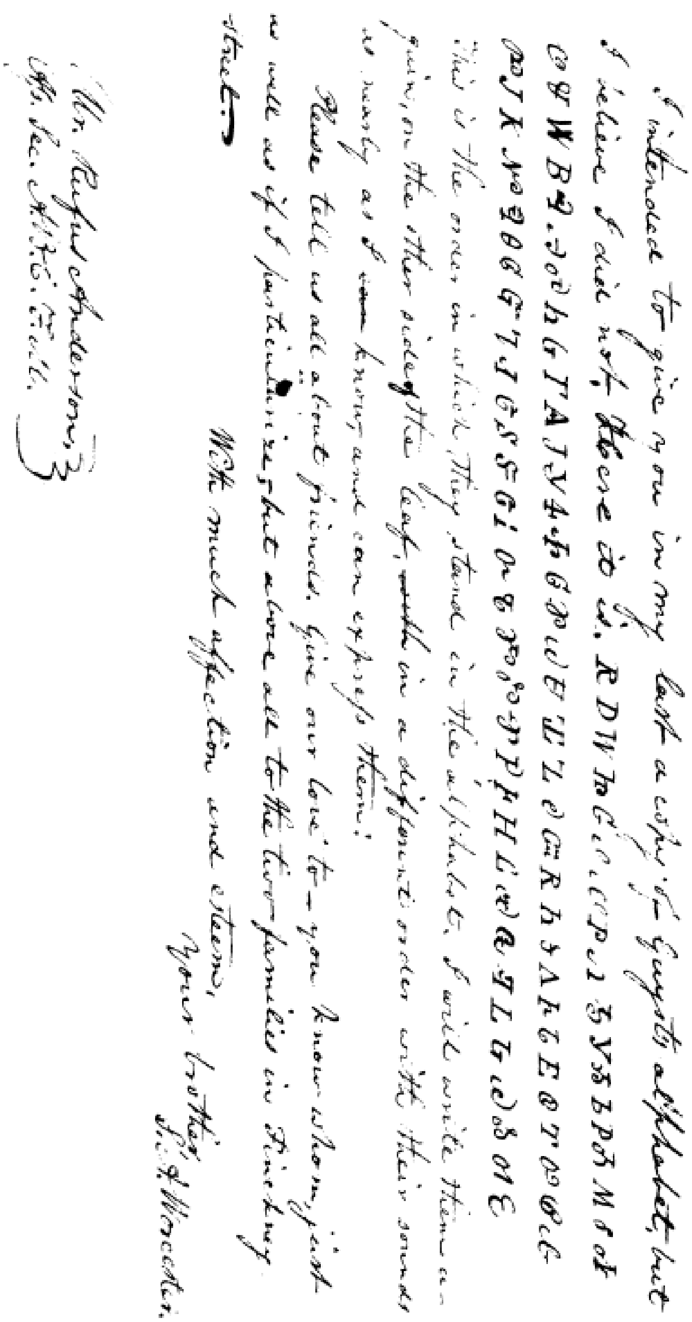
Pattern 4: spine with 2 loops (V)

e	A	La	Tsi	Nah	Wu	We	Li	Ne	Mo	Gi	Yi	Si	Tlv	O	Lu
Le	Ha	Wo	Tlo	Ta	Yv	Lv	Hi	S	Yo	Mv	Hu	Go	Tsu	Mu	Se
So	tli	Qui	Que	Sa	Qua	no	Ka	Tsv	Sv	Ni	Ga	Do	Ge	Da	-
Gv	Wi	I	U	Ye	Hv	Dv	Gu	Tso	Quo	Nu	Na	Lo	Yu	Tse	-
Di	Wv	Du	De	Tsa	V	nv	Te	Ma	Su	Tlu	He	Ho	Mi	-	-
Tla	Ya	Wa	Ti	Tle	Hna	Quu	Dla	Me	Quv	-	-	-	-	-	-

APPENDIX D: PRIMARY DOCUMENT FOR C1 OF TABLE 12. Adapted from Sequoyah Original Syllabary Chart. Retrieved from <https://www.scribd.com/document/350467908/Sequoyah-Original-Syllabary-Chart>. Exact date and source unknown.

	1 a	2 e	3 i	4 o	5 u	6 v
1 Vowels						
2 g						
3 h						
4 l						
5 m						
6 n/hn						
7 qu(ku)						
8 s						
9 d/t						
10 dl/tl						
11 ts						
12 w/(h)w						
13 y/(h)y						

APPENDIX E: PRIMARY DOCUMENT FOR C3 OF TABLE 12. Adapted from Walker, Willard & Sarbaugh, James (1993) (pg18). Worcester, Samuel (1825) Letter dated 22 December 1825 to Rufus Anderson. ABCFM 18.3.1, Vol. 5 Pt. 2, item 229, Papers of the ABCFM microfilm reel 739, frames 591-93. Woodbridge, CT: Research Publications.



I intended to give you in my last a copy of Guyst's alphabet, but I believe I did not. Here it is. [illegible]

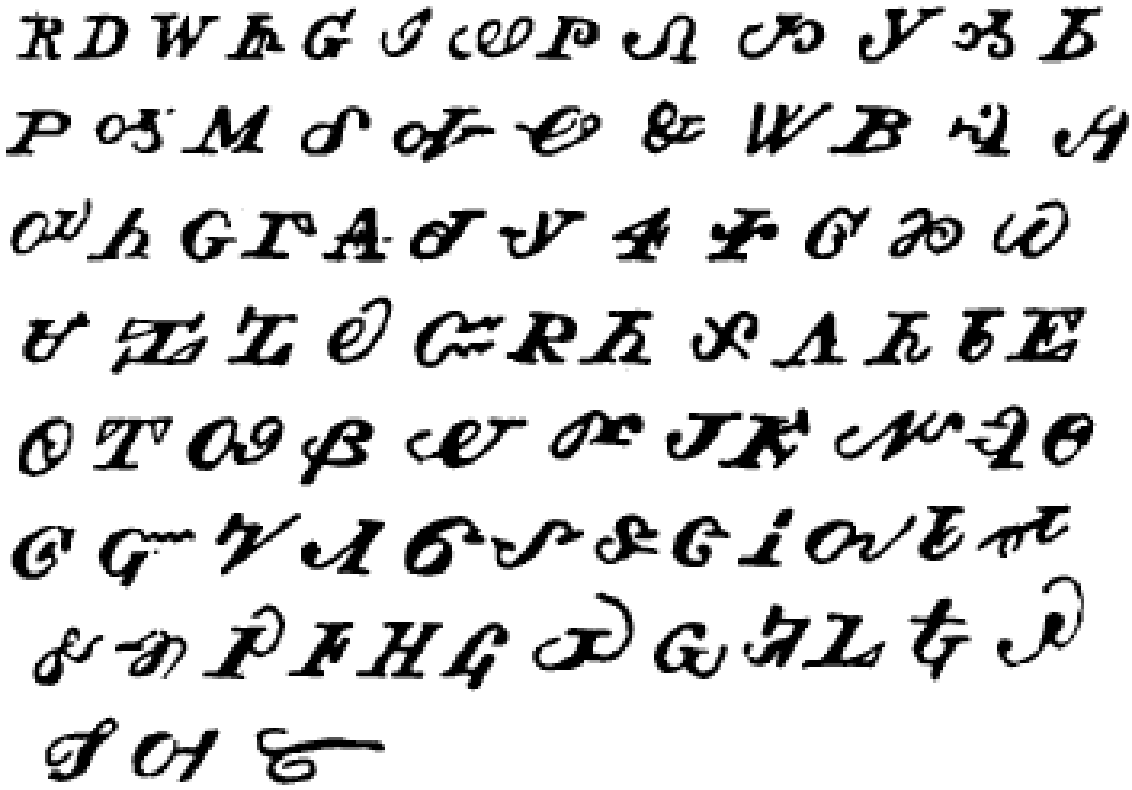
This is the order in which they stand in the alphabet. I will write them again, on the other side of the leaf, ~~with~~ in a different order with their sounds as nearly as I ~~can~~ know, and can express them:

Please tell us all about friends. Give our love to – you know whom, just as well as if I particularize, – but above all to the two families in Pinckney street.

With much affection and esteem,
Your brother,
S. A. Worcester.

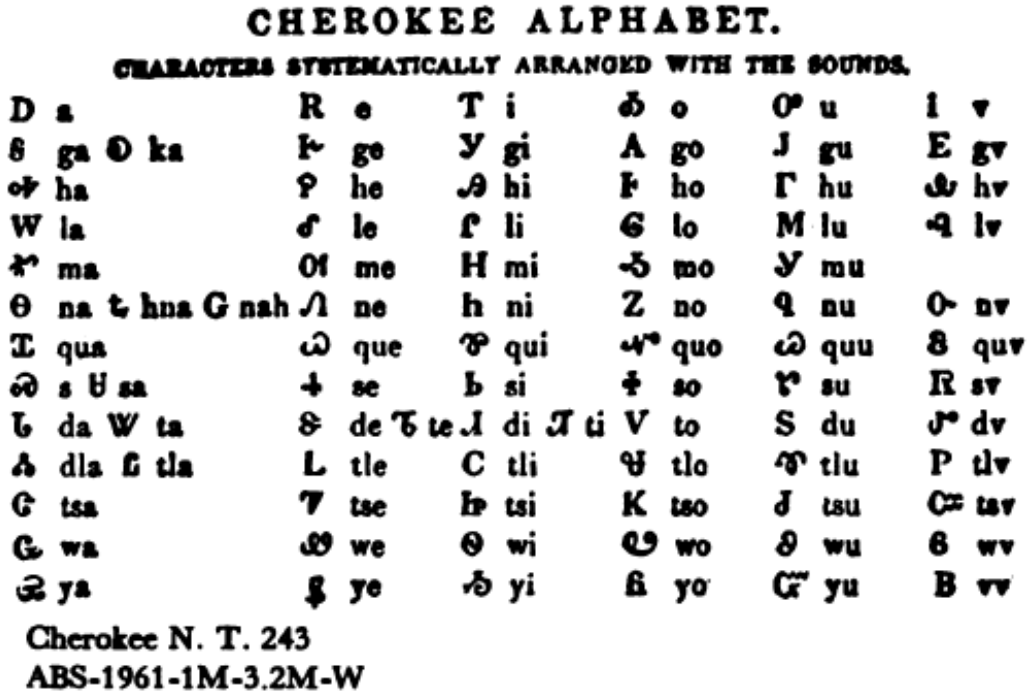
Mr. Rufus Anderson,
Ass. Sec. A.B.C. F.M.

APPENDIX F: PRIMARY DOCUMENT FOR C4 OF TABLE 12. Adapted from Walker, Willard & Sarbaugh, James (1993) (pg19). The Early History of the CS. Ethnohistory, 40(1), pp. 70-94. Barbour, James (1826). "Letter from the Secretary of War, to the chairman of the Committee on Indian Affairs, accompanied by a bill for the preservation and civilization of the Indian tribes within the United States." Document No. 102, 19th Congress, 1st session. Washington City: Gales and Seaton.



APPENDIX G: PRIMARY DOCUMENT FOR C8 OF TABLE 12. Adapted from Walker, Willard & Sarbaugh, James (1993) (pg 6). The Early History of the CS. Ethnohistory, 40(1), pp. 70-94.

APPENDIX H: PRIMARY DOCUMENT FOR C9 OF TABLE 12. Adapted from Walker, Willard & Sarbaugh, James (1993) (pg5). The Early History of the CS. Ethnohistory, 40(1), pp. 70-94. Anonymous (1961) Cherokee New Testament. New York: American Bible Society.



CHEROKEE ALPHABET.

CHARACTERS SYSTEMATICALLY ARRANGED WITH THE SOUNDS.

D a	R e	T i	Ꭷ o	Ꮭ u	Ꮁ v
Ꭶ ga Ꭷ ka	Ꮁ ge	Ꮳ gi	Ꭺ go	Ꭻ gu	Ꭼ gv
Ꮄ ha	Ꮅ he	Ꮉ hi	Ꮋ ho	Ꮇ hu	Ꮓ hv
W la	Ꮮ le	Ꮯ li	Ꮶ lo	M lu	Ꮻ lv
Ꮜ ma	Ꮝ me	H mi	Ꮾ mo	Ꮿ mu	
Ꮎ na Ꮤ hna Ꮆ nah	Ꮑ ne	h ni	Z no	Ꮹ nu	Ꮕ nv
Ꮵ qua	Ꮷ que	Ᏺ qui	Ᏽ quo	Ꮸ quu	Ꮺ quv
Ꮥ s Ᏸ sa	Ꮪ se	Ꮰ si	Ꮻ so	Ᏻ su	R sv
Ꮣ da Ꮗ ta	Ꮄ de Ꮦ te	Ꮖ di Ꮩ ti	V to	S du	Ꮼ dv
Ꮕ dla Ꮮ tla	L tle	C tli	Ꮸ tlo	Ꮹ tlu	P tlv
Ꮆ tsa	Ꮼ tse	Ᏹ tsi	K tso	Ꮷ tsu	Ꮽ tsv
Ꮶ wa	Ꮾ we	Ꮿ wi	Ᏸ wo	Ᏹ wu	Ᏺ wv
Ꮻ ya	Ᏼ ye	Ᏽ yi	᏾ yo	᏿ yu	B vv

Cherokee N. T. 243
ABS-1961-1M-3.2M-W

Figure 1. The Cherokee syllabary as it appears on the first page of the *Cherokee New Testament* (Anonymous 1961).

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